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Final Rule

Third Third Waste Volumes, Characteristics, and Required and Available Treatment Capacity

Volume III

CHAPTER 4
APPENDIX A - APPENDIX I

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BACKGROUND DOCUMENT FOR THIRD THIRD WASTES TO SUPPORT 40 CFR PART 268 LAND DISPOSAL RESTRICTIONS

FINAL RULE

THIRD THIRD WASTE VOLUMES, CHARACTERISTICS, AND REQUIRED AND AVAILABLE TREATMENT CAPACITY

Volume III

CHAPTER 4
APPENDIX A - APPENDIX I

U.S. Environmental Protection Agency
Office of Solid Waste
401 M Street, S.W.
Washington, D.C. 20460

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4. CAPACITY ANALYSIS METHODOLOGY

This section of the background document presents a detailed discussion of the methodology (approach) and rationale for the capacity analyses supporting this final rule.

Section 4.1 includes a brief discussion of the data sources and the of the waste volume data set used for capacity analysis. Section 4.1 also presents a detailed discussion of the methodology used for determining the required alternative capacity for land disposed wastes (demand). Section 4.2 provides a detailed discussion of the determination of available alternative capacity (supply) and the creation of the alternative capacity data sets used for the analysis. Finally, Section 4.3 describes the methodology used to compare the waste volumes and the associated required alternative capacity (demand) with the supply of available capacity to determine whether adequate capacity exists to support the land disposal restrictions.

4.1 Determination of Required Treatment Capacity

This section presents a detailed discussion of the analytical methodology used to determine the demand for alternative treatment capacity required by wastes affected by the Third Third final rule.

4.1.1 Waste Volumes Affected

To assess the requirements for alternative treatment capacity that will result from the Third Third final restrictions, including contaminated soils, it was necessary to identify waste volumes by land disposal method, waste code, and physical/chemical form. With this information, it is possible to identify which treatment technologies are applicable to the waste volumes and to determine required alternative treatment capacity.

(1) Data Sources

The TSDR Survey, which includes data from the CWM-Emelle Chemical Waste Management data bases described earlier in Section 2.1.1, was the primary source used to estimate surface-disposed waste volumes. The TSDR Survey data base was the primary source used to estimate underground injected waste volumes.

(2) Identification of Waste Volumes

Land-disposed Third Third final wastes were identified on a waste code basis. For wastes described by a single waste code, the volume was allocated to the appropriate waste code.

For waste groups (mixed wastes and/or wastes described by more than one RCRA waste code), the entire volume was included in the regulatory group of the highest priority code in the group. For example, if a waste group was described by both a solvent waste code (F001-F005) and a Third Third final code, the entire waste volume was assigned to solvents because they were restricted prior to Third Third wastes.

Consequently, to avoid double-counting, only waste volumes for waste groups containing a Third Third final code but no solvents, First Third wastes for which a treatment standard was promulgated on August 8, 1988 (i.e., non-soft hammer First Third wastes), or Second Third promulgated wastes (i.e., non-soft hammer Second Third wastes) have been included in today's estimates of required capacity unless promulgated standards are being revised. Furthermore, if a waste group contained more than one Third Third final code but no previously restricted codes, the volume was divided equally among the Third Third final codes.

(3) Determination of Affected Volumes

Land disposal is defined under RCRA as any placement of hazardous waste into or on the land. Therefore, storage and treatment of hazardous waste in or on the land are also considered land disposal. Land disposal methods can be divided into numerous categories. Five types of land disposal are addressed in detail in this document: disposal in landfills; treatment and storage in waste piles; disposal by land application; treatment, storage, and disposal in surface impoundments; and underground injection. Utilization of salt dome formations, salt bed formations, and underground mines and caves are additional methods of land disposal that are affected by this rulemaking. Currently, there is insufficient information to document the volumes of Third Third final wastes disposed of by these last three methods; therefore, they are not addressed in the analysis of volumes and required alternative treatment capacity.

Estimates of the volumes of affected wastes that have been stored (but not treated or disposed of) in surface impoundments or waste piles are presented. Storage implies a temporary placement of wastes in the surface impoundment or waste pile. EPA has assumed that all of the affected wastes stored in surface impoundments are eventually treated or recycled or that they are routed to permanent disposal in other existing units. To avoid double-counting in this analysis (i.e., counting waste volumes once when they are stored and again when they are finally disposed of), the volumes of wastes reported as being stored in surface impoundments or waste piles were not included in the estimates of volumes requiring alternative treatment capacity. Nevertheless, these wastes will be affected by the restrictions and will require alternative storage capacity. However, if during the facility-level analysis of the responses to the TSDR Survey it was determined that wastes were being stored indefinitely in the impoundment or waste pile (i.e., long-term storage), these volumes were included as requiring alternative treatment capacity because they would not be counted elsewhere. If hazardous waste entered a waste pile or surface impoundment for storage in 1986 but no waste was reported as having been removed from the impoundment or waste pile for treatment or disposal prior to or during 1986, the waste was considered to have undergone long-term storage.

HSWA required that all surface impoundments be in compliance with certain minimum design and operating criteria (minimum technology requirements; see RCRA section 3005(j)) to continue receiving, treating, or storing hazardous waste beyond November 8, 1988. Furthermore, the land disposal restrictions, upon promulgation, forbid placement of restricted wastes in surface impoundments, except for treatment. Consequently, most surface impoundments were replaced by tanks, retrofitted to meet the minimum technical standards, or closed by November 1988. However, because the baseline year for the TSDR Survey is 1986, the 1986 land disposed volumes do not reflect these changes. Therefore, a special analysis of the management of wastes in surface impoundments was conducted. As described in Section 2.1.1, if it could be determined from the survey responses or through facility follow-up that a treatment surface impoundment was being closed without replacement (i.e., the surface impoundment was to be bypassed because it was not crucial to the effective operation of the treatment system), was being replaced by tanks, or was being retrofitted, then the volume was dropped from further analysis of waste requiring alternative treatment capacity.

For surface impoundments used for treatment and long-term storage or for treatment and disposal that were being replaced by tanks or retrofitted, it was sometimes necessary to include the volume of treatment residual generated in the impoundment in 1986 in the volume requiring alternative treatment capacity. Because the impoundment was used for long-term storage or disposal of the treatment residual, the volume was not counted elsewhere as land disposal. Where it could be assumed that the treatment residual would continue to be generated after retrofitting or replacement, the volume of treatment residual generated on an annual basis (not the entire volume entering the impoundment for treatment), was included as requiring alternative treatment capacity. For example, if a facility reported that in 1986 it used a surface impoundment for treatment (settling) and disposal of a Third Third final hazardous waste but that in 1988 it was replacing the impoundment with a settling tank, the volume of waste entering the impoundment in 1986 would not require alternative treatment capacity because it would no longer be land disposed in 1988. However, the volume that settled for disposal in 1986 would still be generated in the tank in 1988 and would require alternative treatment capacity prior to disposal. The treatment residual volume would therefore be included in the volume of wastes requiring alternative treatment capacity. If, however, it was determined that the impoundment was a flow-through impoundment and that only incidental settling occurred (i.e., less than 1 percent of the volume entering was settled), then it was assumed that there would be essentially no settling when the impoundment was replaced by a tank.

The quantities included in the CWM-Emelle data represent the volumes of wastes shipped to CWM-Emelle for disposal by landfilling, but do not necessarily reflect the volumes of wastes actually landfilled. Even though a waste stream was reported with the final handling method representing landfill, it is possible that the waste stream was managed in a manner that could alter its volume prior to being landfilled. CWM-Emelle has a stabilization process and a solvent extraction/fuel blending operation on-site. For purposes of the Third Third final rule, it was assumed that the volume reported being received by CWM-Emelle was the volume landfilled because the actual volume of each waste stream landfilled could not be determined.

One exception to the above assumption involves organic sludges. CWM-Emelle provided additional information indicating that although the landfill handling method was reported as final disposition for some waste streams, only the residuals were landfilled. Based on this information, some of the organic sludge volumes were assumed not to have been land disposed.

4.1.2 Treatability Analysis

Those wastes that require alternative treatment/recovery because of the land disposal restrictions, once identified, must be analyzed to determine the types of alternative treatment required. This process is referred to as treatability analysis. This section discusses the methodology used to perform treatability analyses on the wastes identified as requiring alternative treatment/recovery. The results of the treatability analyses conducted on the waste streams used for this rulemaking are contained in the Commercial Treatment/Recovery Capacity Data Set.

(1) Waste Characterization

Respondents to the TSDR Survey were asked to provide a limited waste characterization, including a waste code (or codes) and a waste description code (A/B codes), for each waste stream being land disposed. The A/B codes classify wastes, at a minimum, by the following general physical/chemical categories: inorganic liquids, sludges, solids, and gases and organic liquids, sludges, solids, and gases. The waste description codes, in some cases, also provide qualitative information on hazardous constituents or characteristics. The waste code and A/B code combinations were the primary source of characterization data used to assess treatability of the wastes.

A limited number of facilities, however, did not provide these codes. If during technical review of the survey or facility follow-up, the facility was either unwilling or unable to provide these codes, engineering judgment was used to assign a waste description code. All available information from the survey was used to assign the waste description codes, including the survey responses and the facility schematic. These sources could provide information on previous management (e.g., whether the waste was a treatment residual), the origin of the waste (e.g., mixture rule and derived from rule wastes), and how the waste was being land disposed (e.g., no liquids in landfills).

In addition, for F and K coded wastes for which the facility did not provide waste description codes, the waste description in 40 CFR Part 261, as well as information contained in a report characterizing RCRA waste streams[1], was used to assign the waste to the most common physical/chemical form. Occasionally, it was not feasible to assign the waste to the most common form. For example, if the available information indicated that the waste was commonly a solid but the waste was being underground injected, it was assumed to be a liquid rather than a solid.

P and U coded wastes for which the facility did not provide waste description codes were generally assigned to either off-spec or discarded products, contaminated soils, or aqueous cleanup residue, depending on the volume, management, and assumed physical/chemical form of each waste. Assumptions regarding the physical form were based on available information from the schematic or survey, including the methods of management or other available information on the chemical constituent such as the Condensed Chemical Dictionary.[2] For example, landfilled wastes were assumed to be either sludges or solids, and underground injected wastes were assumed to be liquids. If the volume of undescribed waste being land disposed was large (i.e., greater than 50 tons for solids or 1,000 gallons for liquids), the waste was assumed to be contaminated soil or aqueous waste derived from a cleanup operation. This was based on the assumption that, for economic reasons, only small volumes of off-spec products are likely to be produced, and therefore only small volumes would be land disposed.

Characteristic hazardous wastes (i.e., D waste codes) for which the facility did not provide waste description codes were generally assigned a waste description based on the method of land disposal used, any information from the schematic or other survey responses, and the characteristic represented by the particular D code as described in 40 CFR, Part 261. For example, pesticide wastes characteristically hazardous for their toxicity were generally considered organic, while toxic metal wastes were considered inorganic.

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[1] Metcalf and Eddy, Inc. 1985. Technologies applicable to hazardous waste. Briefing presented for the U.S. Environmental Protection Agency, Office of Research and Development, Hazardous Waste Engineering Research Laboratory, Cincinnati, Ohio.

[2] Hawley, Gressner G. The Condensed Chemical Dictionary. Van Nostrand Reinhold Company, New York, New York. 1981.

For the purposes of the TSDR Survey, certain X-codes were created to describe hazardous waste residuals that result from the on-site management of many individual RCRA coded wastes that are no longer individually identifiable. One such X-code was XLEA, which was used to describe leachate from hazardous waste landfills. To ensure that the X-codes were not being misused by respondents and that RCRA codes were being used when it was reasonable to do so, an attempt was made to "un-X" X-coded wastes that were reported as land disposed. In the case of XLEA, information from the facility schematic and facility notes, as well as information on the types of wastes entering the landfill, was used to assign RCRA codes to these wastes. However, because by definition these wastes should no longer be individually identifiable, very few X-coded wastes were assigned RCRA codes.

Waste characterization for the CWM-Emelle data was different from TSDR Survey data base because CWM-Emelle supplied brief descriptions of the wastes from their Biennial Report instead of A/B codes. The assignment of A/B codes to each waste stream reported landfilled was based on the RCRA waste code(s) and description provided by CWM-Emelle. When descriptions were inadequate to assess the physical/chemical form of the waste, some standard assumptions were required to assign the A/B codes. The first assumption was that the facility was operating in compliance with all regulations that were in effect during 1987. These regulations include the ban on liquids in landfills and the solvents rule, which restricted the land placement of liquid solvent wastes. This affects the assignment of A/B codes because it must be assumed that any land placed waste stream with a solvent code must either be a sludge or a solid. Also, during 1987, the landfilling of free liquids was banned; therefore, if a description of the waste indicates that the volume reported was a liquid, it was assumed to have been stabilized using CWM-Emelle's on-site stabilization process prior to landfilling.

For F and K coded wastes, the waste description in 40 CFR, Part 261, as well as information contained in a report characterizing RCRA waste streams[3], was used to determine the waste's most common physical/chemical form and assign an A/B code. F006 wastes, wastewater treatment sludges from electroplating operations, required an additional assumption. Cyanides are not always used in electroplating operations; therefore, cyanides are not always present in F006 waste. From the information available on the F006 waste streams land disposed at the CWM-Emelle facility, it is impossible to determine whether the waste streams contain cyanides. As a worst case scenario, all F006 waste streams were assumed to contain treatable levels of cyanides and therefore would require cyanide treatment.

(2) Treatability Grouping/Assigning Alternative Treatment

As previously mentioned, EPA is required to establish treatment standards for those wastes being restricted from land disposal. EPA has the option of either specifying the use of a particular technology or setting a concentration standard based on the performance of the best demonstrated available technology (BDAT). For the Third Third wastes, EPA is generally promulgating concentration standards based on the performance of BDAT; however, for some Third Third wastes, EPA is promulgating the use of the BDAT technology as a method of treatment.

Through use of the characterization data provided by the TSDR Survey, and the other data (i.e., the waste code and A/B code combinations, and consideration of the BDAT technologies identified by EPA) wastes were assessed for treatability and assigned to treatability groups. These treatability groups were then assigned to BDAT treatment or, in some cases, to alternative treatment that EPA believes is capable of meeting the BDAT concentration treatment standard. For example, if the BDAT technology was identified as rotary kiln incineration, it was assumed that other types of incineration with the appropriate feed system would be able to achieve the BDAT standard. In addition, for this analysis, reuse as fuel was also assumed to be equivalent to incineration (incineration and reuse as fuel have been grouped under the general category of combustion), except where the BDAT standard specifies incineration as a method of treatment (e.g., P064).

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[3] Metcalf and Eddy, Inc. 1985. Technologies applicable to hazardous waste. Briefing presented for the U.S. Environmental Protection Agency, Office of Research and Development, Hazardous Waste Engineering Research Laboratory, Cincinnati, Ohio.

Wastes with similar A/B codes that require the same BDAT were assigned to the same treatability groups. Alternative treatment/recovery technologies associated with each treatability group, and descriptions of each alternative treatment/recovery technology are documented in Analysis of Required Capacity Data for the Third Third Final Rule.[4]

In limited cases, waste streams could not be assigned to the treatability group representing the BDAT treatment because the physical/chemical form of the wastes were incompatible with the BDAT treatment. In these cases, an engineering analysis of each waste stream was conducted to assign the waste to an alternative technology believed capable of achieving the BDAT treatment standard. The results of these analyses for each waste stream are presented in the waste code-specific discussions in Section 3. The TSDR Survey does not contain data on the performance of treatment technologies; therefore, several alternative sources[5] and "best engineering judgment" were required to identify potential alternatives to BDAT.

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[4] Versar. 1989. Analysis of Required Capacity Data for the Third Third Wastes Final Rule. Appendix C. Prepared for the Office of Solid Waste. Washington, D.C.: The U.S. Environmental Protection Agency.

A similar analysis was conducted for waste groups (i.e., mixed wastes). Waste groups are hazardous wastes that are described by more than one RCRA waste code, and they present special treatability problems in that they are often contaminated with hazardous constituents that may fall under more than one treatability group (e.g., organics and metals). Such waste groups usually cannot be assigned to only the BDAT technology for one specific waste type. Instead, a treatment train that is capable of treating sequentially each waste type in the group must be developed. Often these treatment trains can be developed by combining BDAT treatments in sequence, or by adding pre- or post-treatment steps to the BDAT technology. Treatment trains were developed using the references mentioned above and engineering judgment.

(3) Treatment Residuals

Treatment technologies generate residuals that create capacity demand. For example, some wastes require incineration followed by stabilization of the incinerator ash and treatment of the scrubber water followed by stabilization of the resultant wastewater treatment sludge. Based on the TSDR Survey responses, it was determined that RCRA permitted incinerators have adequate air pollution control devices (APCD) (including scrubber water treatment at those facilities with wet scrubbers) and that the facilities considered the capacity of their APCDs and wastewater treatment systems when determining the capacity of their incinerators. Therefore, no attempt was made to evaluate capacity for treatment of scrubber waters. Wastewater treatment sludges and incinerator ash requiring stabilization, however, were included in the estimates of treatment residuals requiring capacity.

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[5] USEPA. 1985. U.S. Environmental Protection Agency. Physical-chemical properties and categorization of RCRA wastes according to volatility. EPA-450/3-85-007. Research Triangle Park, N.C.: U.S. Environmental Protection Agency.

IT Enviroscience, Inc. 1983. Survey of industrial applications of aqueous-phase activated-carbon adsorption for control of pollutant compounds from manufacture of organic compounds. Prepared for U.S. Environmental Protection Agency, Industrial Environmental Research Laboratory.

Metcalf and Eddy, Inc. 1985. Technologies applicable to hazardous waste. Briefing presented for the U.S. Environmental Protection Agency, Office of Research and Development, Hazardous Waste Engineering Research Laboratory, Cincinnati, Ohio.

Versar. 1985. Assessment of treatment technologies for hazardous waste and their restrictive waste characteristics. Draft Final Report. Prepared for the Office of Solid Waste. Washington, D.C.: U.S. Environmental Protection Agency.

USEPA. 1986. U.S. Environmental Protection Agency, Office of Solid Waste. Best demonstrated available technology (BDAT) background document for F001-F005 spent solvents. Vols. 1-3. EPA/530-SW-86-056. Washington, D.C.: U.S. Environmental Protection Agency.

Although the entire waste volume would require incineration, only a portion of the original volume would require stabilization because the amount of ash and wastewater treatment sludge generated would be less than the original volume incinerated. To account for these changes in the volume within a treatment train, volume adjustment factors were developed. These factors were developed using engineering judgment and depend on the type of treatment and the physical/chemical form of the waste. The factors represent that percent of the original volume exiting the technology of concern as a residual. For example, the volume adjustment factor used to estimate the volume of ash generated from incineration of an organic sludge is 0.1, or 10 percent of the original volume, and the volume of scrubber water treatment sludge is estimated at 0.01 or 1 percent of the original volume. Therefore, if 100 gallons were incinerated, the volume adjustment factor would estimate that 10 gallons of ash and 1 gallon of wastewater (scrubber water) treatment sludge would be produced as residuals.

(4) Previous Management

Another important factor considered during the treatability analysis of a waste was any previous management. Using information contained in the TSDR Survey and the facility schematics, it was possible to evaluate the previous management, if any, for wastes being land disposed. Whenever possible, the previous management of land disposed wastes was evaluated in an attempt to determine whether the waste had already been treated by the BDAT technology or by a technology believed capable of achieving the BDAT treatment standard. If it could be determined that the waste had been previously treated by such a technology, the waste was assumed to meet the BDAT treatment standard. Such wastes would therefore not be prohibited from land disposal and were consequently not included in further analysis of the volume of wastes requiring alternative treatment/recovery capacity.

4.2 Determination of Available Treatment Capacity

This section presents a detailed discussion of the analytical methodology used to determine the estimates of alternative treatment and recovery capacity available for wastes affected by the Third Third final rule. These processes include "combustion" in incinerators or industrial kilns, furnaces, and boilers, and "other treatment/recovery" processes including solidification/stabilization, solvent and liquid organic recovery for reuse, metals recovery, acid leaching of sludges, neutralization, and wastewater treatment for cyanides, metals, and organics. The discussion of combustion capacity is separate from the discussion of other treatment and recovery capacity. Combustion is predominantly a single unit process system; therefore, the combustion system analysis does not require locating and quantifying a limiting unit within a treatment train of unit processes as in the analysis of other treatment or recovery systems.

4.2.1 Determination of Combustion Capacity

(1) Introduction

The combustion data set used for the proposed rule was established to determine the following information for incineration and reuse as fuel: (1) the utilized capacity during the base or reference year of 1986; (2) the maximum capacity during 1986 and any planned changes through 1992; (3) the unused or available capacity during the periods 1986, 1987, 1988, 1989, and 1990-1992; and (4) the possible interchange of capacity between the various hazardous waste forms (feed capabilities) for these time periods should excess capacity exist for certain forms and shortfalls exist for others. The data set was generated by technical review and engineering evaluation of TSDR Survey responses and facility schematics, followed by development of the data set and data consolidation and aggregation to arrive at national totals.

During the public comment period for the proposed Third Third rule, EPA received several comments on available sludge/solid combustion capacity. Commenters indicated that EPA had omitted available units, included units that may not actually be available, and incorrectly estimated capacity for some units. Sources of suggested error included new operating parameters resulting from permits issued since the TSDR Survey, and new hazardous fuel blending and burning techniques that increase capacity for reusing sludges and solids as fuel. Since the statutory deadline for incineration permit decisions passed in November of 1989, EPA agreed that recent permits could have affected national incineration capacity. As a result, EPA has obtained updated information from EPA regional and state environmental regualtory offices (and in a few cases incineration facility's themselves) and has reevaluated available sludge/solid combustion capacity based on these data for this final rule. Appendix K provides details of EPA's sludge/solid combustion capacity verification analysis.

For each fully commercial hazardous waste incinerators, maximum sludge/solid capacity estimates were determined from the best information available from regional and/or state regulatory agencies. These updates replace the maximum sludge capacity estimates used for the proposed rule. As in the proposed rule, the TSDR Capacity Data Set provided 1986 baseline utilization data used to determine available sludge/solid capacity.

EPA also reevaluated sludge and solid reuse as fuel capacity for the final rule. However, because reuse as fuel units are usually exempt from RCRA permitting requirements, capacity data were generally unavailable. In most cases, EPA was only able to determine if and when a reuse as fuel unit began burning wastes (i.e., did the unit come on-line in 1989 or 1990 as planned according to the TSDR Survey). Except for the new facilities discussed in Appendix K, EPA obtained utilized and maximum capacity estimates from the TSDR Capacity Data Set for capacity estimates for units that were found to have come on-line.

Because available liquids incineration and reuse as fuel capacity greatly exceed required capacity, EPA did not completely reevaluate available liquid incineration or reuse as fuel capacity for this final rule. However, in some cases, EPA uncovered information about available liquid incineration or reuse as fuel units (e.g., that a planned facility would be delayed beyond the planned date reported in the TSDR Capacity Data Set when investigating sludge/solid capacity. In these cases, the TSDR Capacity Data Set was revised to reflect the additional information. EPA also recognizes that identified changes in sludge/solid capacity may have affected (usually reduced) liquid capacity. However, EPA does believe that continued dependence on the TSDR Capacity Data Set for liquid combustion capacity would have affected variance decisions.

For this rule, capacity data from only fully commercial incinerators were used to determine available capacity. Commercial incinerators provide the most readily available capacity, on a national level, to treat the wastes currently being considered under the land disposal restriction rules.

The incineration capacity data compiled for this final rule do not include two other potential categories of waste treatment capacity: limited commercial and captive facility capacity. "Limited commercial" facilities are those that accept wastes from only a limited number of facilities not under the same ownership--in many cases, only from their customers and/or clients for other products or services. "Captive facilities" are those that manage wastes from other facilities under the same ownership. Although capacity from these types of facilities has not been included in this analysis, EPA does not believe that available capacity from these sources would have affected any of the variance decisions for this rule.

To determine reuse as fuel capacity, data from facilities with fully and limited commercial industrial kilns, furnaces, or boilers were included. During the original review of the data set, EPA discovered that most facilities with reuse as fuel units described themselves as limited commercial because they accept waste only from a limited number of facilities not under the same ownership, primarily fuel blenders or waste brokers. Because fuel blenders and waste brokers are typically fully commercial, capacity at limited commercial reuse-as-fuel units was also considered fully commercial.

The revised combustion capacity data set was compared to estimates of waste volumes currently being land disposed that will require combustion capacity to determine whether there is adequate incineration and reuse-as-fuel capacity for all waste forms. Combustion technologies lend themselves well to wastes that are difficult to treat by conventional treatment technologies and are very versatile in that they can treat the various waste forms (liquids, sludges, solids, and gases) with some interchangeability.

(2) Approach and Methodology for the Original Combustion Data Set Used for the Proposed Rule

The original data set was generated by review and engineering evaluation of TSDR Survey responses, transfer of data derived from the questionnaires to the computer data set, and final consolidation of all facility capacities to arrive at national totals. In some cases TSDR responses were updated based on follow-up investigation.

The questionnaires pertaining to incineration and reuse as fuel in the TSDR Survey were Questionnaire B, "Incineration," and Questionnaire C, "Reuse as Fuel." A copy of the two questionnaires can be found in the RCRA docket for this final rule.[6] The questionnaires were designed not only to provide actual utilization and maximum capacity data for each unit at the facility, but also to provide other design and operational information to enable the reviewer to evaluate the accuracy of the facility responses. These other data elements were the following:

- Operating/downtime information;
- Percent utilization;
- Maximum practical thermal rating;
- Average heating value of the hazardous and nonhazardous waste being treated;
- Maximum practical feed rate for each waste form;
- Planned capacity increases/decreases by time period;
- Type of solids that can be fed to the unit; and
- Waste characteristics that exclude or limit acceptance for treatment.

The above information was used by the reviewer, using mass/heat balances and other methods, to evaluate the validity of the facility responses to utilized and maximum capacity questions. If discrepancies in responses were identified, the reviewer would attempt to resolve the discrepancies and contact the facility by telephone to verify findings. If agreeable to the facility, the reviewer would adjust the data.

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[6] US EPA. 1987. U.S. Environmental Protection Agency, Office of Solid Waste. National survey of hazardous waste treatment, storage, disposal, and recycling facilities. OMB No. 2050-0070.

In addition, technical review of reported capacity data included the evaluation of incinerator or reuse-as-fuel support systems such as waste feed handling systems, air pollution control devices, scrubber water treatment systems, and ash handling systems.

The following types of incinerators were considered in the TSDR Survey:

- Liquid injection
- Rotary (or rocking) kiln
- Rotary kiln with liquid injection
- Two-stage
- Fixed hearth
- Multiple hearth
- Fluidized bed
- Infrared
- Fume/vapor
- Pyrolytic destructor
- Other (specify).

The following types of units were considered in the Reuse as Fuel questionnaire:

- Cement kiln
- Aggregate kiln
- Asphalt kiln
- Other kiln (specify)
- Blast furnace
- Sulfur recovery furnace
- Smelting, melting, or refining furnace
- Coke oven
- Other furnace (specify)
- Industrial boiler
- Utility boiler
- Process heater
- Other reuse as fuel (specify).

The computer data set used to consolidate and analyze capacity data from Questionnaires B and C included the following information (brief explanation of each data element):

1. Facility ID - The USEPA identification number for the facility

2. Facility Name

3. Unit No. - data were gathered on a unit basis since some facilities have more than one incinerator or kiln

4. Commercial status - the two commercial categories are facilities that (1) accept waste from the general public (full commercial) and (2) accept waste from a limited number of facilities not under the same ownership (limited commercial); the two noncommercial categories are facilities that (3) accept waste from facilities under the same ownership (captive) and (4) manage wastes generated on-site (on-site)

5. Unit type - a code for the type of incinerator or reuse as fuel unit (as described earlier)

6. Fixed or Mobile unit (F/M)

7. Exempt (Y/N) - RCRA permit status

8. Thermal Rating, MBtu/hr

9. Waste Feed Mix (Y/N)

   A. liquids
   B. sludges
   C. solids
   D. gases

10. Unique (Y/N): If yes, explain.

11. Capacity 1986

    A. Hazardous Waste Quantity - this amount represents the quantity of RCRA hazardous waste treated in the subject unit during calendar year 1986. This quantity is also referred to as utilized capacity.

    B. Nonhazardous Waste Quantity - this is the quantity of nonhazardous waste that was treated in the same unit, either concurrently or separately, during 1986.

    C. Hazardous Waste Maximum Quantity (Capacity) - the maximum quantity of hazardous waste that the treatment unit could have treated during 1986.

    D. All Waste Maximum Quantity (Capacity) - the maximum quantity of both hazardous and nonhazardous waste that could have been treated in 1986.

12. Planned changes or new units, by time period, for 1987 through 1992.

The above data were used to tabulate and develop the original combustion capacity data set used for the proposed rule. This data set will be discussed in Section 4.2.3, Development of the Treatment Capacity Data Set and Results. The data were compiled in a computer data base for more convenient data management. A copy of the data sheets, along with a description of their use, can be found in the Procedures for Completing PC Data Sheets for Priority TSDR Facilities.[7]

As discussed earlier in this section, revised sludge/solid combustion capacity data are presented in Appendix K. To make the necessary comparisons for this analysis, the original facility responses and revised estimates were converted to one standard unit, volume in gallons. Data reported in short tons (2,000 lb/ton) by facilities were consistently converted to gallons by using a conversion factor of 240 gal/ton (based on the density of water) for all waste forms other than gases. Gases are reported in standard cubic feet (SCF) in the initial data and were converted to tons by assuming an average molecular weight of 29. However, the analyses were done in the appropriate units (e.g., tons for solids) and simply converted to gallons for consistent presentation of units. It is also assumed that the units reported as operational in 1986 with no closure dates reported will continue to operate through 1992.

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[7] Versar. 1988. Procedures For Completing PC Data Sheets For Priority TSDR Facilities. Prepared for the Office of Solid Waste. Washington, D.C.: U.S. Environmental Protection Agency.

4.2.2 Determination of Other Treatment System Capacities

The capacity data set also includes data on treatment systems other than combustion that may be able to treat Third Third final wastes to their respective treatment standards. These technologies include solidification/ stabilization and wastewater treatment processes. Because the TSDR Survey and other data for these treatment processes are reported on a unit process basis, a method was developed to derive a system capacity from the unit process data. The results of this analysis were aggregated into a hazardous waste treatment system capacity data set for comparison with required capacity.

For this final rule, capacity data from only fully commercial treatment facilities were used to determine available capacity. These data represent the most readily available capacity, on a national level, to treat the waste that is currently being considered under the land disposal restrictions rule. The capacity indicated by the commercial data set does not include information on two other potential categories of waste treatment capacity, limited commercial and captive facility capacity. "Limited commercial" facilities are those that accept wastes from only a limited number of facilities not under the same ownership--in many cases, only from their customers and/or clients. "Captive facilities" are those that manage wastes from other facilities under the same ownership. Data are not yet available for these two categories to include in this analysis. However, EPA does not believe that available capacity from these sources would have affected any of the variance decisions for this rule.

(1) Unit Process Capacity

The TSDR Survey requested capacity data on a process-specific basis. A process is defined in the TSDR Survey as one or more units of equipment acting together to perform a single operation on a waste stream. A system is defined in the TSDR Survey as one or more processes that work together to treat a waste stream. Figure 4-1 presents the process codes provided for the TSDR Survey respondent to report treatment process information.

Figure 4-1

PROCESS CODES

These process codes were developed specifically for this survey to describe the on-site hazardous waste management operations at a facility.

TREATMENT AND RECYCLING

Incineration/thermal treatment

1I Liquid injection
2I Rotary (or rocking) kiln
3I Rotary kiln with a liquid injection unit
4I Two stage
5I Fixed hearth
6I Multiple hearth
7I Fluidized bed
8I Infra-red
9I Fume/vapor
10I Pyroltic destructor
11I Other incineration/thermal treatment

Reuse as fuel

1RF Cement kiln
2RF Aggregate kiln
3RF Asphalt kiln
4RF Other kiln
5RF Blast furnace
6RF Sulfur recovery furnace
7RF Smelting, melting, or refining furnace
8RF Coke oven
9RF Other industrial furnace
10RF Industrial boiler
11RF Utility boiler
12RF Process heater
13RF Other reuse as fuel unit

Fuel blending

1FB Fuel blending

Solidification

1S Cement or cements/silicate processes
2S Pozzolanic processes
3S Asphaltic processes
4S Thermoplastic techniques
5S Organic polymer techniques
6S Jacketing (macro-encapsulation)
7S Other solidification

Recovery of solvents and liquid organics for reuse

1SR Fractionation
2SR Batch still distillation
3SR Solvent extraction
4SR Thin-film evaporation
5SR Filtration
6SR Phase separation
7SR Dessication
8SR Other solvent recovery (including pretreatment)

Recovery of metals for reuse

1MR Electrolytic
2MR Ion exchange
3MR Reverse osmosis
4MR Solvent extraction
5MR Secondary smelting
6MR Liming
7MR Evaporation
8MR Filtration
9MR Sodium borohydride
10MR Other metals recovery (including pretreatment)

Wastewater treatment

Equalization
1WT Equalization

Cyanide oxidation
2WT Alkaline Chlorination
3WT Ozone
4WT Electrochemical
5WT Other cyanide oxidation

General oxidation (including disinfection)
6WT Chlorination
7WT Ozonation
8WT UV radiation
9WT Other general oxidation

Chemical precipitation
10WT Lime
11WT Sodium hydroxide
12WT Soda ash
13WT Sulfide
14WT Other chemical precipitation

Chromium reduction
15WT Sodium bisulfite
16WT Sulfur dioxide
17WT Ferrous sulfate
18WT Other chromium reduction

Complexed metals treatment (other than chemical precipiation by pH adjustment)
19WT Complexed metals treatment

Emulsion beraking
20WT Thermal
21WT Chemical
22WT Other emulsion breaking

Adsorption
23WT Carbon adsorption
24WT Ion exchange
25WT Resin adsorption
26WT Other adsorption

Stripping
27WT Air stripping
28WT Steam stripping
29WT Other adsorption

Evaporation
30WT Thermal
31WT Solar
32WT Vapor recompression
33WT Other evaporation

Filtration
34WT Diatomaceious earth
35WT Sand
36WT Multimedia
37WT Other filtration

Sludge dewatering
38WT Gravity thickening
39WT Vacuum filtration
40WT Pressure filtration (belt, plate and frame, or leaf)
41WT Centrifuge
42WT Other sludge dewatering

Air flotation
43WT Dissolved air flotation
44WT Partial aeration
45WT Air dispersion
46WT Other air flotation

Oil skimming
47WT Gravity separation
48WT Colescing plate separation
49WT Other oil skimming

Other liquid phase separation
50WT Decanting
51WT Other liquid phase separation

Biological treatment
52WT Activated sludge
53WT Fixed film-trickling filter
54WT Fixed film-rotating contactor
55WT Lagoon or basin, aerated
56WT Lagoon, facultative
57WT Anaerobic
58WT Other biological treatment

Other wastewater treatment
59WT Wet air oxidation
60WT Neutralization
61WT Nitrification
62WT Denitrification
63WT Flocculation and/or coagulation
64WT Setting (clarification)
65WT Reverse osmosis
66WT Other wastewater treatment

OTHER PROCESSES (TREATMENT OR RECOVERY)

1TR Other treatment
2TR Other recovery for reuse

ACCUMULATION

1A Containers
2A Tanks

STORAGE

1ST Container (i.e., barrel, drum)
2ST Tank
3ST Waste piles
4ST Surface impoundment
5ST Other storage

DISPOSAL

1D Landfill
2D land treatment
3D Surface impoundment (to be closed as a landfill)
4D Underground injection well

During technical review, three different interpretations by respondents of the process capacity questions were identified, which determined the method of system capacity analysis to be used by the reviewer.

Case I: Each unit process was reported separately. In such a case, process units must be aggregated into treatment systems so that the available capacity of the systems can be calculated from the reported maximum and utilized process capacities.

Case II: The capacity for each process type was combined and reported as one process by the facility, including when the same process was conducted in several different units (tanks or surface impoundments) found in different systems. Responses to the tank and/or surface impoundment questionnaires were used to obtain the utilized capacity of each tank and/or surface impoundment using the process of concern. The maximum capacity of these tanks and/or surface impoundments was obtained by facility contact. The unit process data were then aggregated into treatment systems as in Case I.

Case III: The survey respondent reported the entire treatment system as one process. The utilized and maximum capacities reported for the process were used to represent the entire system. If the individual unit processes that make up the treatment system could not be identified by examining the facility schematic and responses to other questions in the survey, the facility was contacted to obtain that information. The respondent's system data were then inputted into the capacity data set.

Upon completion of technical review, the following information was obtained and examined prior to use in the system capacity analysis:

- All processes that compose the system and the units in which they occur were identified, and a flow diagram was constructed.

- The amount of hazardous and nonhazardous waste that enters and leaves the system was quantified so that a mass balance around the system could be conducted.

- The utilized and maximum capacities of each unit were determined.

- If surface impoundments were used in the treatment system, it was determined whether they met minimum technological requirements. The effect of closing, retrofitting, or replacing the surface impoundment with a tank or new minimum technological surface impoundment on system capacity was determined.

- Also noted were any other planned changes to the system and how they might affect the maximum capacity of the unit and/or system.

(2) Hazardous Waste Treatment/Recovery System Identification

Using the facility schematics, with revisions made as a result of technical review, hazardous waste treatment/recovery systems and their respective unit processes were identified. For purposes of the capacity analysis, a hazardous waste treatment/recovery system was identified by each hazardous waste entry point into a unit process or sequence of unit processes. The system begins at the process unit where the hazardous waste stream(s) first enters and consists of all other treatment or recovery process units downstream from the point of entry.

The following examples demonstrate system identification. Figure 4-2 shows a simple hazardous wastewater treatment system. Hazardous waste can enter the three-unit processes for treatment at only one point, the chemical precipitation process. Therefore, there is only one hazardous waste treatment system. The system consists of chemical precipitation, clarification/settling, and sludge dewatering (filter press) processes. Note that by this method, recycle streams and nonhazardous waste streams do not affect system identification.

Figure 4-3 depicts three hazardous waste treatment systems. Three hazardous waste entry points exist at three different units, which perform three different processes. The chromium waste treatment system consists of chromium reduction, chemical precipitation of chromium, settling, and sludge dewatering processes. The cyanide waste treatment system consists of a cyanide oxidation process followed by chemical precipitation of metals, and settling and dewatering of the resultant treatment sludge. The third is a treatment system for a general metal-containing waste consisting of chemical precipitation of metals, settling, and sludge dewatering. Note that the three systems share some of the same unit processes. These three systems may be linked together by competing for the capacity of the shared units. If the system capacity determination reveals that at least one of the shared units

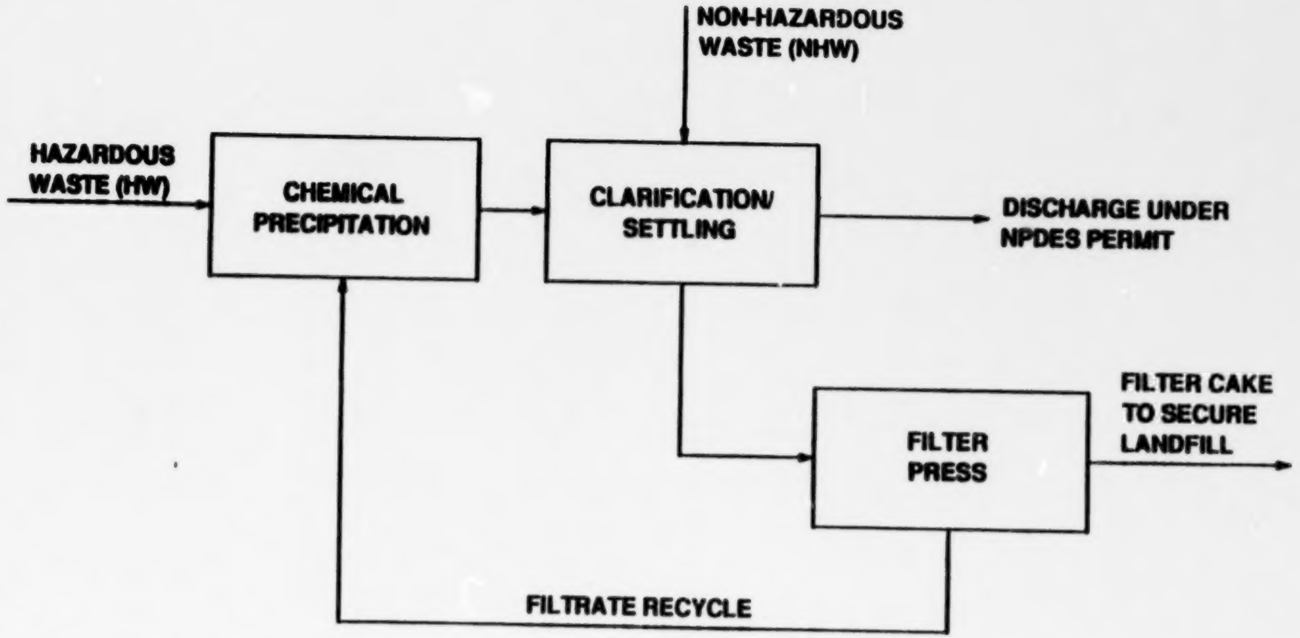
NON-HAZARDOUS
WASTE (NHW)
HAZARDOUS
WASTE (HW)
CHEMICAL
PRECIPITATION
CLARIFICATION/
SETTLING
DISCHARGE UNDER
NPDES PERMIT
FILTER CAKE
TO SECURE
LANDFILL
FILTER
PRESS
FILTRATE RECYCLE

FIGURE 4-2. FLOW DIAGRAM OF A SIMPLE SYSTEM

F80158 1

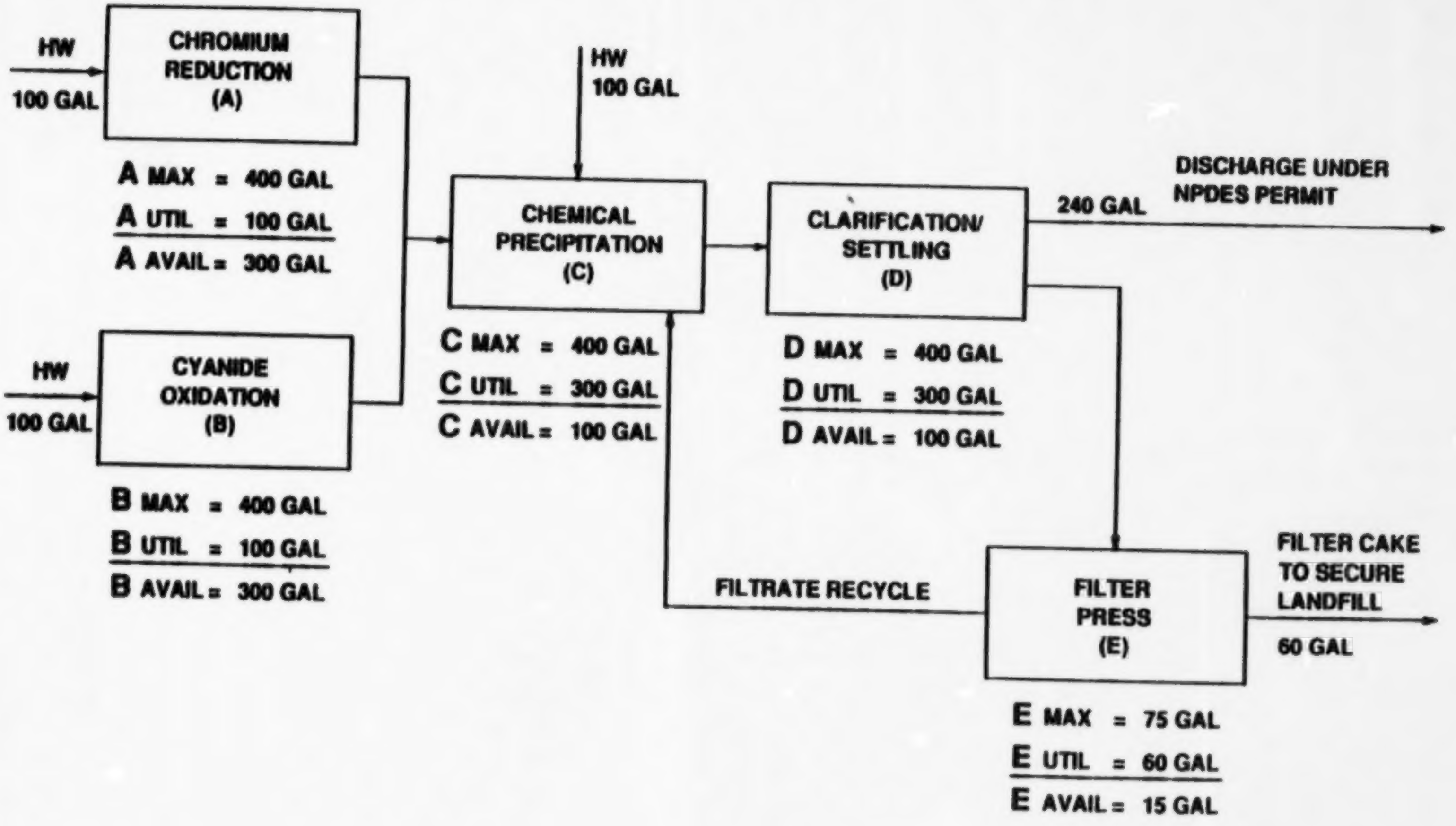
HW
100 GAL
CHROMIUM REDUCTION (A)
A MAX = 400 GAL
A UTIL = 100 GAL
A AVAIL = 300 GAL
HW
100 GAL
CYANIDE OXIDATION (B)
B MAX = 400 GAL
B UTIL = 100 GAL
B AVAIL = 300 GAL
HW
100 GAL
CHEMICAL PRECIPITATION (C)
C MAX = 400 GAL
C UTIL = 300 GAL
C AVAIL = 100 GAL
CLARIFICATION/ SETTLING (D)
D MAX = 400 GAL
D UTIL = 300 GAL
D AVAIL = 100 GAL
240 GAL
DISCHARGE UNDER NPDES PERMIT
FILTRATE RECYCLE
FILTER PRESS (E)
E MAX = 75 GAL
E UTIL = 60 GAL
E AVAIL = 15 GAL
FILTER CAKE TO SECURE LANDFILL
60 GAL

FIGURE 4-3. FLOW DIAGRAM OF THREE SYSTEMS WITH UNIT PROCESS CAPACITIES

limits the capacity of at least one of the treatment systems, then the three systems are considered linked systems.

At first glance, Figure 4-4 appears to show two systems because there are two hazardous waste entry points. Upon closer examination, it can be seen that the two waste streams feed into two different tanks that conduct the same process in parallel. For purposes of capacity analysis, these two units are considered one process, with the utilized and maximum capacities of the "aggregated unit" equal to the sum of the utilized and maximum capacities of each of the individual units. Therefore, Figure 4-4 depicts only one hazardous waste treatment system.

(3) Determination of System Capacity

To determine the capacity of a treatment system, the utilized and maximum capacity of each unit process must be examined. Where several systems share unit processes, such as in Figure 4-3, all the unit processes that make up each of the potentially linked systems must be considered together for this portion of the analysis.

The capacity determination takes a "snapshot" approach, treating batch and continuous processes similarly by conducting a mass balance based on the amount of waste that was treated and could be treated during the entire year. Survey respondents reported unit capacities as the amount of hazardous waste entering the unit in 1986, the amount of nonhazardous waste entering the unit in 1986, the hazardous waste maximum capacity, and all waste maximum capacity. Volumes from internal recycle streams are considered in the volumes respondents reported for utilized and maximum unit capacities; therefore, recycle streams are not considered separately when conducting systems analysis.

The available capacity for each unit was calculated by subtracting the utilized capacity from the maximum capacity. The available capacities of upstream units were compared with each unit in the process string to locate the limiting unit(s) in the system(s). The overall system capacity was based on the restrictions imposed by the limiting unit.

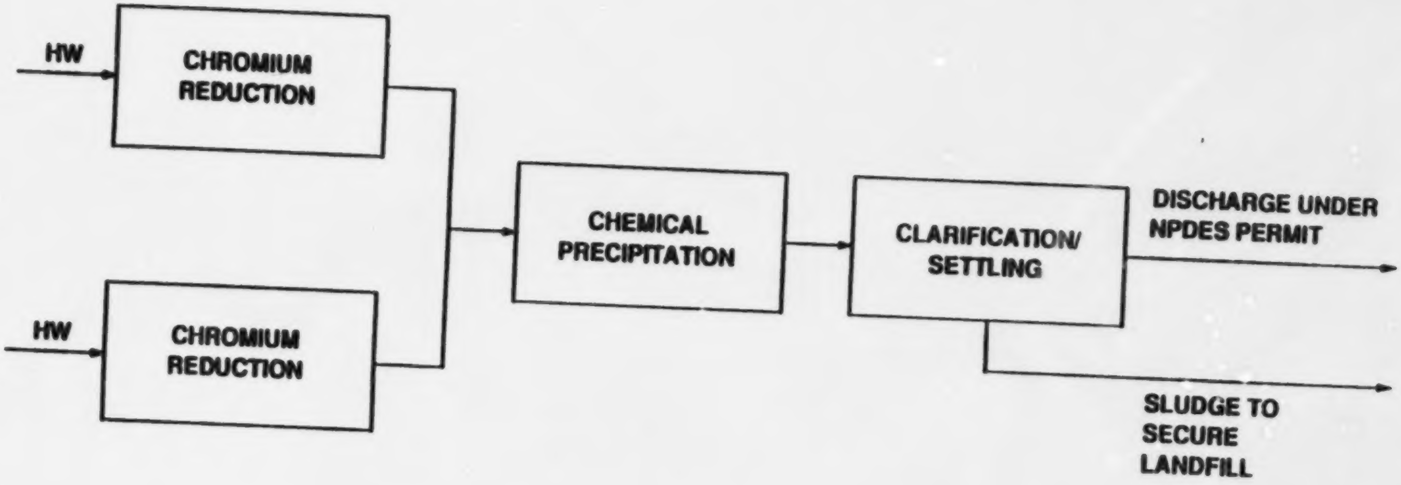
HW
CHROMIUM REDUCTION
HW
CHROMIUM REDUCTION
CHEMICAL PRECIPITATION
CLARIFICATION/ SETTLING
DISCHARGE UNDER NPDES PERMIT
SLUDGE TO SECURE LANDFILL

FIGURE 4-4. FLOW DIAGRAM OF ONE SYSTEM WITH TWO UNITS CONDUCTING THE SAME PROCESS

F80158 1

The above methodology assumes a 1986 baseline for hazardous and nonhazardous wastes already being treated in the system and uses only that portion of the system's remaining capacity that the respondent claims may be used for hazardous waste treatment. It was assumed that when a survey respondent reported hazardous waste maximum capacity to be less than all waste maximum capacity, the respondent had already considered how much nonhazardous waste would be treated using the system when reporting the hazardous waste maximum capacity for the unit.

The available capacity of a simple system is the available capacity of the limiting unit. In Figure 4-5, B is the limiting unit because it has the smallest available capacity. If one were to try to treat 50 gallons of additional hazardous waste using this system, there would be a bottleneck at unit process B because it has room for only 25 additional gallons of waste. Therefore, the system has only 25 gallons of available hazardous waste treatment capacity. The maximum hazardous waste treatment system capacity would be 75 gallons--50 gallons of hazardous waste capacity already utilized plus the additional 25 gallons of available capacity based on limiting unit B.

When more complicated systems are analyzed, care must be taken that the total available capacities affecting a downstream unit are considered. Referring to the unit capacities provided in Figure 4-3, if the amount of waste being treated in units A and B were increased by 300 gallons in each unit (i.e., if they were run at their maximum capacities), unit C would become a bottleneck because it has only 100 gallons of available capacity. In other words, when units directly upstream of the unit of concern are in parallel, one must add the available capacities of the upstream units before comparing them with the available capacity of the unit of concern to determine whether that unit limits (imposes a restriction on) the maximum capacity of the upstream units (Example: $A_{Avail} + B_{Avail} = 600$ gal and 600 gal $> C_{Avail}$).

The effective available capacity of an upstream unit must be calculated for comparison with the downstream unit's available capacity in cases where only a portion of the waste treated in the upstream unit is treated in the downstream unit of concern. If one refers to Figure 4-3, one must consider the effluent stream from the clarifier being discharged under an NPDES permit

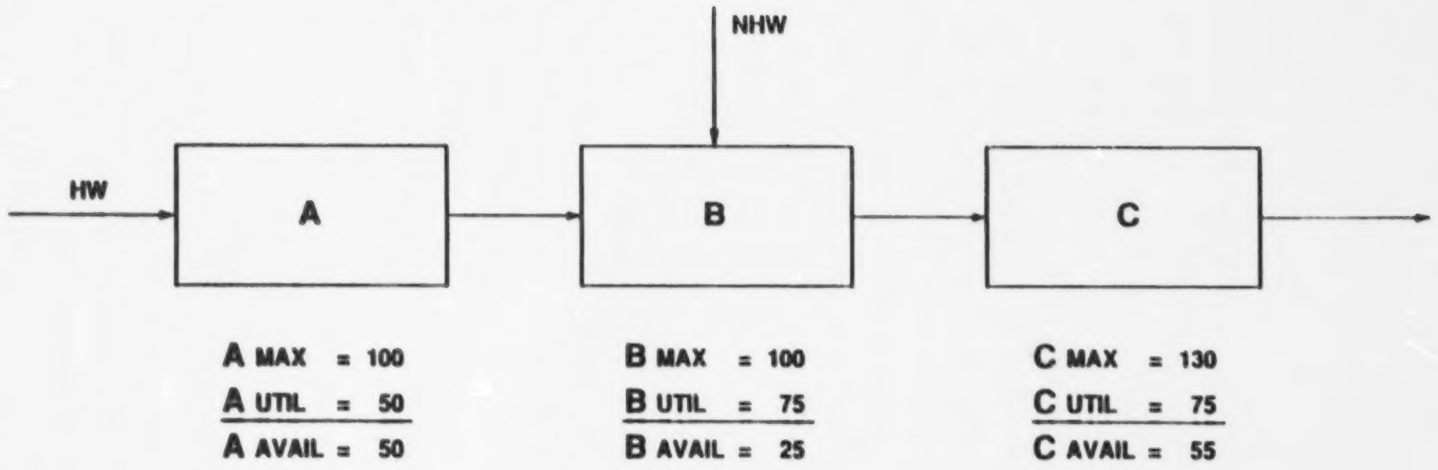
NHW
HW
A
B
C
A MAX = 100
A UTIL = 50
A AVAIL = 50
B MAX = 100
B UTIL = 75
B AVAIL = 25
C MAX = 130
C UTIL = 75
C AVAIL = 55

FIGURE 4-5. FLOW DIAGRAM WITH UNIT CAPACITIES

when determining the effect of using the available capacity of the clarifier on the available capacity of the filter press. That fraction of waste being treated in the upstream unit that continues to the downstream unit is calculated. Under the assumption that as the utilized capacities of these units are increased, the percent of waste that is treated in both upstream and downstream units remains constant, the calculated percent is applied to the reported available capacity of the upstream unit before that capacity is compared with the available capacity of the downstream unit.

In Figure 4-3, the fraction of waste (D_p) going from the clarifier to the filter press (unit E) is calculated by:

$$D_p = \frac{E_{util}}{D_{util}} = \frac{60}{300} = 0.2.$$

Twenty percent of the waste treated by unit D is treated by unit E. Now the available capacity of the clarifier affecting the filter press (D_{eal}) is calculated:

$$D_{eal} = (D_p)\ (D_{avail}) = (0.2)\ (100) = 20 \text{ gallons.}$$

If the amount of waste being treated in the clarifier is increased to its maximum capacity, then 20 more gallons of waste will flow to the filter press. A comparison of the effective available capacities, however, indicates that the filter press limits the maximum capacity reported for the clarifier:

$$E_{avail} < D_{eal} \text{ or } 15 \text{ gallons} < 20 \text{ gallons.}$$

Considering the fact that the filter press limits the maximum capacity of the clarifier, the "new" available capacity of the clarifier must be compared to the capacity of the upstream unit, the chemical precipitation unit. The limiting effect of the filter press on the available capacity of the clarifier (D_{nac}) is quantified as follows:

$$D_{nac} = \frac{E_{avail}}{D_p} = \frac{15}{0.2} = 75 \text{ gallons.}$$

Based on the comparison of the "new" available capacity of the clarifier with the upstream chemical precipitation unit and the earlier comparison made between the chemical precipitation unit and the parallel upstream units, the filter press limits the capacities of all the other units in the process string.

At this point, the capacity analysis switches from a unit-by-unit analysis to a systems analysis. The effect of the limiting unit on the system's available and maximum capacity is determined. As previously discussed, Figure 4-3 shows three hazardous waste treatment systems. The utilized capacity of each of these systems is the amount of waste that enters each system for treatment. The utilized capacities for the chromium waste treatment, cyanide waste treatment, and metals waste treatment are 100 gallons each. The available capacity of each system, as determined by the effect of the limiting unit, is 75 gallons. This quantity, which was derived above, reflects the effluent stream that exits the systems upstream from the limiting filter press. The maximum capacity of each system equals the utilized capacity of the system plus the available capacity of the system. The maximum capacities of the chromium waste, cyanide waste, and metals waste treatment systems equal 175 gallons each.

When waste treatment systems share a limiting unit, as shown by the three systems in Figure 4-3, they compete for the available capacity of that limiting unit. Because of this competition for limited capacity, these linked systems cannot all operate at their maximum capacities, as calculated above. A linked system can operate at its maximum capacity only if all the other systems to which it is linked continue to operate at the utilized capacities reported for 1986. The maximum capacities of each of the linked systems serve as end points when sufficient capacity for waste volumes requiring treatment is sought. Using the example shown in Figure 4-3 to illustrate, if additional chromium waste is sent to the chromium treatment system, then there is that much less additional capacity for cyanide waste and metals waste treatment. If the chromium waste treatment system operates at maximum capacity, then no additional waste may be sent to the cyanide waste treatment system or the metals waste treatment system.

To avoid overestimating available treatment capacity, a proportioned system capacity is calculated for linked systems. The proportioned system capacity is based on how much of the limiting unit's capacity was devoted to each linked system during the TSDR Survey base year of 1986. First, the fractional flow of hazardous waste contributed by each linked system to the limiting process is determined. Using the systems shown in Figure 4-3:

Fractional flow of chrome treatment system = CR_p

Fractional flow of cyanide treatment system = CN_p

Fractional flow of metals treatment system = M_p

$$CR_p = \frac{CR_{util}}{CR_{util} + CN_{util} + M_{util}} = \frac{100}{100 + 100 + 100} = \frac{100}{300} = 0.333$$

$$CN_p = 0.333;\ M_p = 0.333.$$

Note that M_{util} is the utilized capacity of the metals treatment system, not the utilized capacity of the chemical precipitation unit. The utilized capacity of the chemical precipitation unit is the sum total of the utilized capacities of all three systems.

The effect of the limiting unit on each available system capacity is proportioned to each system based on the fractional flow determination. Continuing the calculation to determine the proportioned available capacity (CR_{pac}) using the above example:

$$CR_{pac} = (CR_p)\ (D_{nac}) = (0.333)\ (75) = 25 \text{ gallons}$$

$$CN_{pac} = (CN_p)\ (D_{nac}) = 25 \text{ gallons}$$

$$M_{pac} = (M_p)\ (D_{nac}) = 25 \text{ gallons.}$$

Note that D_{nac}, the previously calculated "new" available capacity of unit D, reflects the effect of the limiting unit on all three systems and accounts for the effluent stream that exits the system before reaching the limiting unit.

When a linked system has an unshared limiting unit upstream from the mutually shared limiting unit of the other linked system(s), the system's calculated proportioned available system capacity must be compared with the available capacity of its limiting unit. If the limiting unit's available capacity is less than the calculated proportioned available system capacity, the final proportioned available system capacity equals the available capacity of the unshared limiting unit. The remainder of the calculated proportioned available system capacity is redistributed to the remaining linked systems based on how extensively the mutually shared limiting unit is devoted to the remaining linked systems. In the example shown in Figure 4-3, the limiting unit for all three systems is the shared filter press; therefore, no comparisons are necessary.

The proportioned maximum system capacity equals the utilized system capacity plus the proportioned available system capacity. The proportioned maximum system capacities (PMC) for the systems displayed in Figure 4-3 are:

$$CR_{PMC} = CR_{util} + CR_{pac} = 100 + 25 = 125 \text{ gallons}$$

$$CN_{PMC} = 125 \text{ gallons}$$

$$M_{PMC} = 125 \text{ gallons.}$$

(4) Projections of Available Capacity

The TSDR Survey requested capacity data for the baseline year 1986 and for changes or new operations planned through 1992. Projections of capacity beyond 1986 were obtained from the data by engineering analysis of information regarding new treatment/recovery systems being installed and equipment changes being made to the systems operating in 1986 that result in changes in system capacity.

For new systems, capacity analyses were conducted as described above and the results were input into the treatment system data set for the appropriate years. Reported equipment changes to treatment systems operating in 1986 were examined to determine their effect on the system capacity. If the change involved the system's limiting unit or influenced the effect of a limiting unit on the system, then capacity analyses were performed again, incorporating the capacity changes for that year.

4.2.3 Development of the Treatment Capacity Data Set and Results

The treatment/recovery capacity data set consists of an incineration/reuse as fuel data set and other treatment systems data set. System capacity data derived from data reported in the TSDR Survey, as described above, were entered onto data entry sheets. The purpose of these forms was to standardize information required for assessing available treatment capacity that was to be obtained from the TSDR Survey and entered into a computer data set. The data set is described in a report that can be found in the docket for this final rule.[8] A detailed discussion of the data entry sheets can also be found in the RCRA docket for this final rule.[9] Revised sludge/solid incineration and reuse as fuel data are presented in Appendix K.

The following discussion presents the results of the incineration/reuse-as-fuel data set.

(1) Incineration/Reuse-as-Fuel Data Set Results

Table 4-1 summarizes the commercial capacity for hazardous waste incineration. This table presents the utilized, maximum, and available capacity for incineration of liquids, sludges, solids, and gases in 1986, and maximum and available capacity for 1987, 1988, 1989, 1990, and 1991-1992. For this table, it is assumed that hazardous waste capacity not utilized in 1986, as well as all new hazardous waste capacity from 1987 and beyond, will be available for incineration of hazardous wastes, and the impact of previous land disposal restrictions on available capacity is not considered.

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[8] Versar. 1989. The commercial treatment/recovery TSDR survey data set. Prepared for the Office of Solid Waste. Washington, D.C.: U.S. Environmental Protection Agency.

[9] Versar. 1988. Technical Review Procedures for Completing PC data sheets for priority TSDR facilities. Prepared for the Office of Solid Waste. Washington, D.C.: U.S. Environmental Protection Agency.

For commercial incinerators of sludges and solids, EPA determined whether facilities reporting planned capacity additions in 1989/90 had become operational. At the time of the proposed rule, EPA had information indicating that Alchem-Tron in Cleveland, Ohio, had come on-line. The available capacity for this facility was therefore included in the total 1989 available capacity reported in Table 4-1. All other additional commercial incineration capacity reportedly planned for 1989/90 was included in the planned 1990-1992 capacity, leaving only verified available capacity at currently operating facilities in the 1989 total.

Table 4-2 summarizes the commercial capacity for reusing hazardous wastes as fuel. The table presents the utilized, maximum, and available capacity for combustion of liquids, sludges, and solids as fuel in 1986, and maximum and available capacity for 1987, 1988, 1989-1990, and 1991-1992. Again, it is assumed that hazardous waste capacity not utilized in 1986, and all new hazardous waste capacity from 1987 and beyond, will be available for combustion of hazardous wastes, and the impact of previous land disposal restrictions on available capacity is not considered.

For commercial facilities reportedly reusing hazardous sludges and solids as fuel, EPA determined that none of the facilities reporting planned capacity additions in 1989/90 would be operational in 1989. Due to the large number of facilities reportedly reusing hazardous liquids as fuel, and the excess available capacity to handle the alternative treatment of land-disposed wastes, EPA did not include the 1989/90 planned additions to capacity in the total 1989 available capacity. All additional to commercial capacity for reuse as fuel reportedly planned for 1989/90 are included in the planned 1990-1992 capacity total.

Table 4-1 Summary of Commercial Hazardous Waste Incineration Capacity
(Million Gallons/Year)

Physical form of waste	1986 Utilized Capacity	May 1990 Maximum Capacity	May 1990 Available Capaicty[a]	December 1990 Maximum Capacity	December 1990 Available Capacity[a]
Liquids	63	113	50	113	50
Sludges/Solids	20	77	57	161	141
Gases	0	3	3	3	3
TOTAL	83	193	110	277	194

Source: TSDR Survey results as of May 1990.

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[a] Projected based on maximum capacity for that year minus utilized capacity for 1986. This considers that capacity not utilized in 1986 and all new capacity (from 1987 and beyond) will be available for incineration of hazardous waste being land disposed that may be affected by the land disposal restrictions.

Table 4-2 Summary of Commercial Capacity for Peuse of Hazardous Waste as Fuel
(Million Gallons/Year)

Physical form of waste	1986 Utilized Capacity	May 1990 Maximum Capacity	May 1990 Available Capaicty[a]	December 1990 Maximum Capacity	December 1990 Available Capacity[a]
Liquids	99	376	277	376	277
Sludges/Solids	<1	24	24	48	48
TOTAL	99	400	301	424	325

Source: TSDR Survey results as of May 1990.

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[a] Projected based on maximum capacity for that year minus utilized capacity for 1986. This considers that capacity not utilized in 1986 and all new capacity (from 1987 and beyond) will be available for burning (reuse as fuel) of hazardous wastes being land disposed that may be affected by the land disposal restrictions.

(2) Development of the Data set for Other Treatment Systems

Data entry sheets were filled out for other treatment systems, and the data were entered into a computer data set. The data set contains data entry fields as well as calculated fields used to perform the capacity analysis. A more detailed explanation of the data fields contained in the data set can be found in a report in the RCRA docket for this rule.[10]

The data set has four major treatment system categories, each of which is divided into subcategories. A more detailed discussion of how and why the categories were developed is given below. The categories and subcategories, along with the codes used to represent them within the data set, are listed as follows:

I. Wastewater Treatment

Process	Code
- Cyanide Oxidation	WW, CO
- Chrome Reduction	WW, CR
- Organics/Metals Treatment	WW, OMT
- Organics/Metals Biological Treatment	WW, OMB
- Sulfide Precipitation	WW, SP
- General Chemical Precipitation	WW, GCP
- Steam Stripping	WW, SS
- Air Stripping	WW, AS
- Biological Treatment	WW, BT
- Carbon Adsorption	WW, CA
- General Oxidation	WW, GO
- Wet-Air Oxidation	WW, WAO
- Neutralization	WW, N

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[10] Versar. 1988. Technical Review Procedures For Completing PC Data Sheets For Priority TSDR Facilities. Prepared for the Office of Solid Waste. Washington, D.C.: U.S. Environmental Protection Agency.

II. Solvent Recovery

Process	Code
- Thin Film Evaporation	SR, TF
- Fractionation/Distillation	SR, FD
- Solvent Extraction	SR, SE
- Other Solvent Recovery	SR, O

III. Metals Recovery

Process	Code
- High Temperature Metals Recovery	MR, HT
- Retorting	MR, R
- Secondary Smelting	MR, SS
- Other Metals Recovery	MR, OMR

IV. Solidification

Process	Code
- Solidification	SL, S

The maximum, utilized, and available capacities were totaled for all systems in the data base that fell under each category. Each category is mutually exclusive so that the capacity of a treatment system is not double-counted. The treatment systems were categorized by using the computer to search each record for key unit types (process codes) that would identify the appropriate category under which the system should be placed. For example, records indicating systems with unit types identified by process codes 2WT, 3WT, 4WT, or 5WT, and 10WT through 15WT were categorized under cyanide oxidation. These categories are used because the BDAT program has identified them as treatment methods that may be effective in attaining the treatment standards established under the solvents and dioxins, California list, First Third, Second Third and Third Third final rules.

(3) Treatment Capacity Data Set Results

Only a subset of the treatment systems that compose the treatment capacity data set was required by the Third Third promulgated wastes. These treatment categories have been identified under the BDAT program as being effective in attaining the applicable treatment standards. Under each category, only commercial treatment systems were aggregated to establish a national supply of available treatment capacity that can be used to meet the demand created by the Land Disposal Restriction Rules.

Table 4-3 presents the maximum, utilized, and available capacities of commercial treatment systems (other than combustion) of concern for the baseline year 1986 and capacity projections through 1992. When making these projections, the 1986 utilized capacities of these treatment systems were assumed to remain constant for the subsequent years. Where a linked system exists, the proportioned system capacity for the linked system is used to avoid overestimating available capacity. For commercial treatment systems that closed between 1986 and 1988 or will close in 1989 or 1990, the utilized capacity of that system remained in the analysis under the assumption that the waste volumes the system was treating will require commercial capacity elsewhere. Keeping the utilized capacity of the closed system in the analysis results in reducing the available commercial capacity for that category. The data in this table were summarized from a report on commercial treatment capacity.[11]

1989 data included in the available capacity analysis section of the Second Third final rule were based on facility projections made in 1987. For each rule, EPA contacts facilities to verify critical projected capacities reported in the TSDR Survey. Since promulgation of the Second Third final rule, EPA has contacted some facilities that anticipated additional available capacity for 1989. Based on the information provided by facility contacts, EPA has determined that several facilities did not come on-line as early as projected. As a result, 1989 data have been adjusted to reflect this new

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[11] Versar. 1989. The Commercial Treatment/Recovery TSDR Survey Data Set. Prepared for the Office of Solid Waste. Washington, D.C.: U.S. Environmental Protection Agency.

Table 4-3 Summary of Commercial Treatment System Capacities (Million Gallons/Year)[a]

Technology Description	Utilized	1986		1987		1988		1989-1990		1991-1992	
		Maximum Capacity	Available Capacity	Maximum Capacity	Available Capacity	Maximum Capacity	Available Capacity	Maximum Capacity	Available Capacity	Maximum Capacity	Available Capacity
Alkaline chlorination	1	3	2	3	2	3	2	3	2	3	2
Alkaline chlorination followed by chemical precipitation	6	27	20	27	20	27	20	29	22	28	22
Biological treatment	75	88	13	88	13	122	47	138	63	138	63
Biological treatment followed by chemical precipitation	CBI	CBI	CBI	CBI	CBI	CBI	CBI	CBI	CBI	CBI	CBI
Biological treatment followed by carbon adsorption	31	37	6	37	6	37	6	37	6	37	6
Carbon adsorption	5	7	2	7	2	7	2	19	14	19	14
Carbon adsorption followed by chemical precipitation	6	33	28	33	28	42	37	106	101	74	68
Chromium reduction followed by carbon adsorption followed by chemical precipication	7	31	25	31	25	31	25	32	25	32	26
Chemical precipitation	115	224	109	224	108	224	109	244	129	244	129
Cyanide oxidation followed by chemical precipitation	2	2	<1	2	<1	70	68	70	68	70	68
Chromium reducation followed by chemical precipitation	148	292	145	292	145	290	142	339	191	342	195
Fractionation/distillation	85	370	285	366	281	369	284	376	291	375	290

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[a] Numbers may not add exactly because of rounding. Technologies with utilized maximum and available capacity numbers that have been revised since the Second Third Final rule due to updated information.

Table 4-3 (continued)

Technology Description	Utilized	1986		1987		1988		1989-1990		1991-1992	
		Maximum Capacity	Available Capacity	Maximum Capacity	Available Capacity	Maximum Capacity	Available Capacity	Maximum Capacity	Available Capacity	Maximum Capacity	Available Capacity
General chemical oxidation followed by chromium reduction followed by chemical precipitation	42	71	28	71	28	71	28	71	28	70	28
High temperature metals recovery	34	67	34	67	34	67	34	67	34	67	34
Neutralization	25	143	117	143	117	61	36	182	157	182	157
Retorting	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Secondary smelting	49	52	3	71	23	86	37	98	49	98	49
Solvent extraction	1	10	9	10	9	10	9	10	9	10	9
Stabilization (cement and pozzolonic)	141	615	474	623	482	892	750	1,938	1,796	2,192	2,051
Steam stripping	1	2	2	2	2	2	2	2	2	2	2
Sulfide precipitation	70	296	226	304	234	304	234	281	211	278	208
Thin film evaporation	43	92	50	102	59	108	65	149	106	131	89
Treatment of reactives followed by chromium reduction followed by chemical precipitation	1	3	2	3	2	3	2	3	2	3	2
Wet air oxidation	0	0	0	0	0	<1	<1	18	18	18	18
Wet air oxidation followed by carbon adsorption	0	0	0	0	0	<1	<1	<1	<1	<1	<1
Wet air oxidation followed by chemical precipitation	0	0	0	0	0	<1	<1	<1	<1	<1	<1
Wet air oxidation followed by chromium reduction	0	0	0	0	0	<1	<1	<1	<1	<1	<1

information. Five of the technologies required for the Third Third final rule were affected by this new information. These technologies include: 1) carbon adsorption followed by chemical precipitation, 2) neutralization, 3) secondary smelting 4) stabilization; and 5) alkaline chlorination followed by chemical precipitation. The capacity analysis incorporating the information obtained from the facility contacts is presented in Appendix J for alkaline chlorination followed by chemical precipitation. Details of the facility contacts are provided in the phone logs (Appendix J). Technologies affected by additional information include chemical precipitation, chromium reduction and chemical precipitation, and wet-air oxidation.

In addition to the available capacity revisions mentioned above, EPA also made revisions based on a redefinition of three technologies required for the Third Third proposed rule: 1) chemical oxidation followed by chemical precipitation; 2) biological treatment followed by chemical precipitation; and 3) chemical precipitation. In the Second Third final rule, the BDAT treatment for several waste codes specified general chemical oxidation and chromium reduction/chemical precipitation as a required treatment train. As a result, general chemical oxidation and chemical precipitation and general chemical oxidation and chromium reduction/chemical precipitation were analyzed separately. For the Third Third rule, however, there are no waste codes that require general chemical oxidation and chromium reduction/chemical precipitation. Therefore the distinction between the two technologies is not necessary for the Third Third final rule.

For multi-source leachate wastewater, EPA proposed concentration standards based on wet-air oxidation followed by carbon adsorption, or biological treatment followed by carbon adsorption for organics and chemical precipitation for inorganics. For the final rule, EPA is promulgating concentration standards based on biological treatment followed by chemical precipitation, or wet-air oxidation followed by carbon adsorption followed by chemical precipitation for organics and inorganics. Hence, a new treatment process, biological treatment followed by chemical precipitation, is added to the capacity analysis in the final rule.

Finally, for chemical precipitation the capacity numbers reported in this rule include the utilized, maximum, and available capacity for both chemical precipitation and sulfide precipitation. For the Second Third rule, these technologies were analyzed separately. Because this distinction has no significant impact on the capacity analysis for the Third Third final rule, however, EPA has consolidated chemical precipitation and sulfide precipitation into one category, chemical precipitation.

4.3 Capacity Analysis (Comparison of Required and Available Treatment Capacity)

As previously described, EPA is responsible for determining whether sufficient capacity exists to meet the requirements of the land disposal restrictions. This involves the comparison of required and available capacity. Available treatment capacity can be categorized by facility status as follows:

- On-site (private capacity) - facilities that manage only waste generated on-site.
- Captive capacity - facilities that manage only waste from other facilities under the same ownership.
- Limited commercial capacity - facilities that manage waste from a limited number of facilities not under the same ownership.
- Commercial capacity - facilities that manage waste from any facility.

The data set contains information on commercial capacity (also limited commercial capacity for reuse as fuel) from baseline year 1986 and information on planned changes to 1986 management methods and new processes to be installed from 1987 through 1992. The methodology for determining the amount of available treatment capacity was described in Section 4.2. Information on captive capacity was not incorporated into the analysis for this proposed rule because EPA does not believe that this capacity would have affected the variance decisions.

Required capacity consists of wastes previously land disposed that will require treatment to meet a treatment standard prior to being land disposed. These volumes of waste were identified and underwent treatability analysis, as described in Section 4.1. The result of the treatability analysis was the assignment of waste volumes to treatability subgroups.

The comparison of required and available capacity was performed on a facility-by-facility basis. This was done to match treatability subgroups with available capacity of applicable treatment/recovery systems. Available on-site treatment capacity was matched only to volumes that were previously land disposed on-site and were determined to require alternative treatment. If the appropriate treatment/recovery technology was not available on-site, or if adequate available capacity was not present to manage the waste, then the remaining volume of waste requiring alternative treatment was aggregated into a national demand for commercial capacity. The final aggregate of national demand was then compared with the final estimates of national commercial capacity to match treatability subgroups with appropriate treatment technologies. This methodology was used by EPA to make final determinations concerning variances.

APPENDIX A

MULTI-SOURCE LEACHATE

APPENDIX A

MULTI-SOURCE LEACHATE

A.1 INTRODUCTION

The Hazardous and Solid Waste Amendments (HSWA) of 1984 mandated that EPA promulgate regulations restricting the land disposal of hazardous wastes. The land disposal restrictions are effective immediately upon promulgation. However, the Agency can grant a national variance from the statutory date to specific wastes if there is insufficient treatment or recovery capacity available for these wastes. Both the capacity of available treatment or recovery technologies and the quantity of restricted wastes currently sent to land disposal are used to determine whether variances should be granted to multi-source leachate. This analysis was designed to determine whether adequate capacity exists to treat multi-source leachate that will become restricted from land disposal as a result of the Third Third Rule. The analysis focuses on primary data sources to determine the actual volumes of multi-source leachate or residuals from the treatment of multi-source leachate currently going to land disposal and to evaluate whether there is enough available capacity to treat these wastes.

Multi-source leachate is defined as leachate derived from the disposal of more than one listed or characteristic hazardous waste. Leachate from characteristic waste is considered multi-source if it exhibits more than one characteristic. In the Third Third of the land disposal restrictions, such leachate will be prohibited from land disposal. Residues from treating such leachate, as well as residues such as soil and ground water that are contaminated by such leachate, are also subject to land disposal prohibition under this rule. Leachate deriving from a single source must meet the standard developed for the waste code from which it is derived and is therefore not subject to the standards developed for multi-source leachate. In cases where other restricted wastes not initially present in the leachate are mixed with the multi-source leachate, any standards applicable to those other restricted wastes continue to apply.

EPA originally imposed a land disposal ban on multi-source leachate under the First Third of the land disposal restrictions (LDRs). Under the land ban, multi-source leachate would have to be treated to satisfy all the standards applicable to the original wastes from which the leachate is derived (see 53 FR 31146-150 (Aug. 17, 1988)). EPA revisited the issue of multi-source leachate treatability to address concerns raised by the hazardous waste management industry, and rescheduled promulgation of a land disposal ban for multi-source leachate to the Third Third of the LDRs in order to fully study the most appropriate section 3004(m) treatment standards for multi-source leachate (see 54 FR 8264 (January 27, 1989)).

Multi-source leachate is generated primarily at landfills where a variety of wastes have been land disposed and leachate is eventually created. This leachate is derived from multiple sources that may no longer be identified individually. The management of multi-source leachate varies depending on the age of the generating facility, its regulatory status, the physical/chemical composition of the multi-source leachate, the volumes of leachate generated, and the waste treatment processes used at a particular facility. In general, multi-source leachate can be expected to be generated at facilities containing landfills which have received a large number of wastes over time.

The remainder of this Appendix discusses the data bases and the methodology used in this analysis, highlights the major caveats and limitations of the analysis, and presents the results of the capacity analysis of multi-source leachate.

A.2 DATA SOURCES

This section documents the data sources reviewed for the multi-source leachate capacity analysis. These include the TSDR Survey and the TSDR Capacity Data Set, the Generator Survey, data submitted by the hazardous waste management industry, and other data sources. Each are discussed below. We present in the last subsection the data actually used in the analysis.

A.2.1 TSDR Survey and TSDR Capacity Data Set

The TSDR Survey was conducted by EPA in 1986 to collect information on the management practices at hazardous waste treatment, storage, disposal, and recycling (TSDR) facilities. The TSDR Capacity Data Set was created from selected responses to the TSDR Survey. The TSDR Capacity Data Set focuses on the treatment and disposal capacity and on the land disposal volumes of hazardous wastes. The TSDR Capacity Data Set provides data on disposal methods at TSDR facilities, such as landfills and surface impoundments, and the waste volumes associated with each disposal practice at both commercial and non-commercial facilities.

EPA used the following specific information from the TSDR Survey in the capacity analysis for multi-source leachate:

- The quantity of multi-source leachate generated on-site;
- The quantity of multi-source leachate received from off-site;
- The quantity of multi-source leachate placed (i.e., treated, stored, or disposed) in land disposal units (i.e., waste piles, surface impoundments, landfills, land treatment units, and underground injection wells); and
- The commercial status of the facility.

From the TSDR Capacity Data Set, EPA retrieved waste stream data for facilities reporting multi-source leachate from hazardous waste landfills (coded as XLEA) or waste descriptor code B16 (identifying leachate which could be single source or multi-source), as well as other useful data from both commercial and non-commercial facilities. EPA used this information to estimate the quantity of multi-source leachate reported as being generated and land placed.

The Agency also identified all landfills and surface impoundments (including storage, treatment, and disposal surface impoundments) that did not report XLEA or B16 (descriptor code for leachate), because there is a reasonable belief that these facilities may have generated leachate and therefore would require further analysis.

In order to show the flow of waste within facilities that manage hazardous waste, facilities were asked to complete two types of schematics in the TSDR Survey: (1) a general facility-wide schematic or flow diagram showing the hazardous waste management activities and operations the facility has and how they relate to one another; and (2) detailed schematics of the treatment and recycling operations identified in the general facility-wide schematic, showing how individual units operate within the system (such as tanks, surface impoundments, incinerators, and boilers) and how the processes in these systems relate to one another.

The information available from these schematics includes:

- Each treatment or recycling operation available on-site;
- The types of processes used to treat and dispose of the wastes;
- Number of tanks and surface impoundments in which these processes occur;
- The points in the treatment/recycling/disposal operations in which reagents or chemical additives enter a process;
- The points in the operation in which wastes and/or treatment residuals enter or exit a process;
- Whether wastes are rendered non-hazardous;
- The physical form of the waste throughout the processes (e.g., dewatered sludge);
- The types of hazardous wastes entering the facility from off-site and points at which residuals that are not managed on-site are sent off-site.
- The origination of the wastes; and
- The types of systems where discharges are sent.

A.2.2 Generator Survey

The Generator Survey was designed to be used in conjunction with the TSDR Survey. This data base contains information on capacity as well as generated waste streams. All facilities were required to complete Questionnaire GA, "General Facility Information," and Questionnaire GB, "Hazardous Waste Characterization." Facilities that completed the TSDR Survey were only required to submit Questionnaires GA and GB.

From Questionnaire GB, EPA extracted information on Questions 1 through 27. We only requested responses for generators who reported "XLEA" as the RCRA waste code or reported "B16" (leachate) as the waste descriptor code. Responses to Questions 1 through 19 provide information on:

- The sources of leachate generation;
- The quantities of waste generated on-site during 1985 and 1986;

- The quantities of waste disposed on-site;
- The quantities of waste managed on-site;
- The general sequences of management operations the leachate went through on-site during 1986;
- The quantities of waste discharged to POTWs or discharged under NPDES permits; and
- The quantities of waste shipped off-site for treatment(s) performed.

This information was used to identify waste management practices for leachates.

Questions 20 through 27 provide information on the physical and chemical characteristics of the leachate. Responses to Questions 20 through 27 provided such information as metals content and the range in concentration of other hazardous constituents. This information is used to determine leachate treatability categories.

A.2.3 Leachate Treatability Study Plan

A team of industry representatives, including Chemical Waste Management (CWM)/Waste Management of North America (WMNA), Browning Ferris Industries (BFI)/CECOS, DuPont, and Dow Chemical, have provided EPA with information on treatment of leachate. As part of this effort, the industry representatives have put together a study plan on leachate. The five tasks comprising the study plan are:

- Task 1 - Characterization of leachate;
- Task 2 - Full-scale performance evaluation;
- Task 3 - Bench-scale treatment plant operation;
- Task 4 - Stabilization of treatment residues and leachate; and
- Task 5 - Documentation and reporting.

Of these five tasks, only Task 1 has been completed and submitted to EPA by all four industry participants. Because of the large amount of information, these data have been summarized into a more usable format. In conjunction with the leachate treatability study, the Leachate Treatability Group surveyed treatment and disposal firms to determine the volumes of leachate-derived solids produced. These data were submitted to EPA through Dupont by GSX Chemical Services, Mill Service, Inc., US Ecology, Envirosafe Management Services, Inc., Dow Chemical, and Casmalia Resources.

A.2.4 Other Data Sources

EPA reviewed documents from the court case **Chemical Waste Management, Inc. (CWM) vs. U.S. EPA** and comments from previous land disposal restrictions rules. However, these data were of limited use in this analysis.

A.2.5 Data Sources Used in the Analysis

The main source of information for the leachate capacity analysis was derived from the TSDR Capacity Data Set and the TSDR Survey, especially the facility schematics. Data from the Generator Survey and from the hazardous waste management industry were also used by EPA.

The information from the Leachate Treatability Study Plan included little or no data on total quantities treated at the facilities or the quantity of residuals generated. Also, the summarized data do not provide information on physical characteristics of the leachate and its treatment residuals. The leachates are often blended with other waste streams prior to treatment in a wastewater treatment plant, so that concentrations may drop significantly after blending with other wastes going to wastewater treatment. Because of the nature of these study plans, the information was not used in the capacity analysis. However, EPA did use data submitted by the Leachate Treatability Group on the volumes of leachate-derived solids and sludges generated and land disposed.

The other data sources examined by EPA did not provide specific information on the generation and management of multi-source leachate that is needed for this analysis.

A.3 METHODOLOGY

The objective of this analysis was to determine whether adequate alternative treatment capacity exists for the volumes of multi-source leachate that will become subject to the land disposal restrictions. This section describes how EPA used the data sources described in section A.2 to determine the volumes of multi-source leachate requiring alternative treatment or recovery, and to determine whether the available capacity to treat these wastes is sufficient.

A.3.1 Determination of Volumes of Multi-Source Leachate Requiring Alternative Treatment Capacity

The first step in determining whether there is adequate treatment or recovery capacity for the volumes of multi-source leachate affected by the land disposal restrictions is to estimate these volumes.

Respondents to the TSDR Survey were asked to identify the quantity of multi-source leachate (coded as XLEA) going to land disposal units on-site, being sent to land disposal units off-site, or being received from other facilities. These data constituted the baseline of EPA's estimates of the quantity of multi-source leachate actually being land placed.

EPA believed that the volumes of multi-source leachate land placed could be larger than the volumes reported in the TSDR Survey. Therefore, the Agency proceeded to identify all the facilities that could generate and potentially land place multi-source leachate, but did not report doing so in the TSDR Capacity Data Set. This was accomplished using the following steps:

(1) Identifying facilities reporting generation of XLEA in the TSDR

Capacity Data Set but no land placement of XLEA;

(2) Identifying facilities reporting descriptor code B16 (leachate) but no land placement of XLEA;

(3) Identifying facilities reporting generation of XLEA in the Generator Survey but no land placement of XLEA;

(4) Identifying facilities for which reported volumes of leachate generated vary significantly between the TSDR Capacity Data Set and the Generator Survey;

(5) Identifying facilities with landfills or disposal surface impoundments and no leachate volumes reported; and

(6) Developing a list of facilities requiring further analysis based on the previous five steps.

EPA cross-checked the facilities identified in Step 6 with facilities for which additional data had been submitted by industry, and with a list of all the commercial landfills and the largest non-commercial landfills in the country. The Agency identified 52 facilities that are likely to account for most of the multi-source leachate generated and land placed in the United States.

EPA examined facility schematics submitted as part of the TSDR Survey to determine the actual volumes of multi-source leachate likely to be land disposed at these facilities. As discussed in Section A.2.1, these schematics identify all the waste treatment or recycling operations that exist at each facility and enable the tracking of the generation and management of multi-source leachate. The Agency used the facility schematics to estimate the volumes of multi-source leachate residuals land placed at these facilities.

A.3.2 Multi-Source Leachate Categories

The volumes of multi-source leachate that are currently land placed will require alternative treatment once they become restricted from land disposal as a result of the rule. The land disposal restrictions apply to two broad categories of multi-source leachate: wastewaters and nonwastewaters. Within each of these categories, wastes can be organic, inorganic or mixed. During the analysis, EPA identified multi-source leachate volumes for only three of these categories:

- Mixed organic/inorganic wastewaters;
- Mixed organic/inorganic nonwastewaters; and
- Inorganic nonwastewaters.

EPA assigned wastes to these categories using the physical/chemical characteristics of these wastes reported in the Generator survey, descriptor codes for the wastes reported in the TSDR Survey, information provided as part of the facility schematics, and supplementary data provided by the hazardous waste management industry.

A.3.3 Determination of Treatability Groups

In the proposed rule, EPA proposed two options for the development of treatment standards for multi-source leachate. Under the first option, EPA would continue the application of the carry-through principle under which multi-source leachate must meet the standards established for all the waste codes from which it is derived.

Under the second option, EPA would establish one set of wastewater standards and one set of nonwastewater standards for multi-source leachate; these standards would also apply to residuals derived from the storage, treatment or disposal of multi-source leachate.

In the final rule, EPA has selected the second option. EPA is promulgating one set of wastewater and one set of nonwastewater treatment standards. For multi-source leachate in the form of wastewaters, EPA is promulgating treatment standards based primarily on wet air oxidation followed by carbon adsorption followed by chemical precipitation, or biological treatment followed by chemical precipitation for organic and inorganic constituents. For multi-source leachate in the form of nonwastewaters, EPA is proposing a treatment standard based on incineration for organic constituents and on stabilization for wastes containing inorganic constituents.

A.3.4 Assignment of Waste Volumes to Leachate Categories

EPA used the methodology outlined in Section A.3.1 to assign volumes of multi-source leachate currently land placed to the six leachate categories discussed in Section A.3.2. Again, volumes were identified for only three of these categories. Waste volumes were assigned based on the waste information provided in the Generator and TSDR surveys, the facility schematics, and additional data submitted to the Agency by the hazardous waste management industry. In cases where significant volumes could not be readily assigned using the available information, EPA contacted certain facilities directly to confirm their current management practices for multi-source leachate. In a few cases where no additional data could be obtained from primary sources, EPA used its best engineering judgement to determine the most appropriate category of multi-source leachate residuals.

A.3.5 Determination of Available Capacity

EPA used the TSDR Capacity Data Set and other capacity data to determine how much capacity was available to treat the multi-source leachate subject to the land disposal restrictions. EPA estimated the capacity available to treat multi-source leachate by computing the capacity available for each of the treatment technologies used for multi-source leachate prior to the land disposal restrictions, and by subtracting the capacity required to treat other wastes subject to the land ban that are listed as California List, Solvents and Dioxins, First Third, Second Third, and other Third Third wastes (see Section 2.1.2).

A.3.6 Determination of Variances

Finally, EPA determined whether variances would be granted for multi-source leachate in each of the leachate categories by comparing the volumes of multi-source leachate requiring alternative treatment capacity with the available capacity in each treatment category. In cases where there is insufficient alternative capacity, the Agency is granting a two-year variance for multi-source leachate. In cases where there is enough treatment capacity, the Agency is not granting a two-year variance for multi-source leachate.

A.4 CAVEATS AND LIMITATIONS

While EPA used all the primary data sources readily available in analyzing the need for and availability of capacity for treatment of multi-source leachate, the Agency is concerned about data limitations.

This analysis is based on the available information from facilities that provided complete information on leachate generation and management. Thus, the analysis did not address volumes of multi-source leachate wastewater treatment residuals that may be generated and subsequently land disposed but that were not reported. The Agency is also concerned that the volumes of multi-source leachate generation and management reported in the TSDR Survey and in the Generator Survey may be smaller than the actual volumes of multi-source leachate currently generated and managed. The TSDR Survey and the Generator Survey only collected data from active regulated facilities. Multi-source leachate can be generated at closed or unregulated facilities. The volumes of such leachate were not taken into account in this analysis. However, the Agency believes that the general pattern of management of leachate found at the facilities with complete information is representative of the other facilities.

Also, EPA used engineering judgement to determine whether volumes of multi-source leachate reported as land placed at some of the facilities for which schematics were examined contained primarily organic constituents, inorganic constituents, or a mixture of organics and inorganics. While there is some uncertainty associated with these assignments, EPA believes that, in general, they are reasonably accurate.

A.5 SUMMARY OF RESULTS

This section summarizes the key results of the multi-source leachate capacity analysis.

A.5.1 Multi-Source Leachate Generation

EPA extracted information from both the TSDR Survey and the Generator Survey on the quantity of multi-source leachate generated. The information collected from both data sets is summarized below.

A.5.1.1 TSDR/Generator Surveys

The TSDR Capacity Data Set reports volumes of multi-source leachate generated on-site in two ways. The first method assigns the quantity of waste associated with more than one RCRA waste code (i.e., waste streams containing multi-source leachate coded as XLEA and at least one more RCRA waste code) to each waste code within the waste stream. Using this "non-partitioned" method, the total quantity of waste associated with multi-coded waste streams would be counted against each contributing waste code. Conversely, the second method would partition waste streams by the number of waste codes in the waste stream. For example, if 100,000 gallons of waste were associated with four waste codes. 25,000 gallons would be attributed to each waste code.

In the analysis performed for the proposed rule, twenty one facilities reported generating multi-source leachate in the TSDR Survey. Under the first approach, multi-source leachate generation at these facilities totals 91,818,900 gallons. Under the second approach, the quantity of multi-source leachate is 90,640,200 gallons. As these numbers show, the choice of an approach for assigning waste volumes does not have a significant impact on multi-source leachate because most waste streams containing multi-source leachate do not contain other RCRA codes.

Data from the Generator Survey used in the proposed rule indicated that seven facilities generated 7,090,938 gallons of XLEA other than B16 (leachate). Approximately 4 million gallons was listed as XLEA-B20 and was generated by a Land Reclamation facility. In addition, 18 facilities reported generating 133,551,120 gallons of XLEA-B16. Thus, a total of 25 facilities generated 140,642,058 gallons of multi-source leachate.

For purposes of comparison, EPA also extracted information on facilities that generated leachate, as described by B16, associated with a waste code other than XLEA. The Generator Survey indicates that 17 facilities reported 19 such streams, for a total of 62,082,734 gallons. This last group of leachate wastes are assumed to be single source because they can be traced to their original waste code. Therefore, they are not included in this analysis.

While performing the multi-source leachate capacity analysis for the proposed rule, EPA recognized that considerable inconsistencies exist in how different facilities reported their leachate generation and management. In addition, several commenters stated that EPA underestimated the volumes of leachate currently being land disposed.

To address these potential problem areas and to ensure that EPA's efforts represent a reasonable quantification of the multi-source leachate universe, EPA performed an expanded capacity analysis for this final rule. Three steps were taken:

(1) For facilities with land-disposed multi-source leachate volumes in the proposed rule, EPA re-analyzed Survey data and schematics to confirm volumes used and to identify any volumes that should have been included.

(2) For facilities with multi-source leachate generation data but for which no or uncertain volumes were land disposed, EPA re-analyzed

Survey data and schematics and made engineering assumptions where possible to address areas of uncertainty.

(3) For facilities with on-site landfills that did not report leachate generation, EPA raised leachate generation and management questions by phone. A small set of landfills of this type were contacted.

A detailed discussion of this analysis is provided on a facility basis in Attachments A, B, and C to this Appendix.

A.5.1.2 Total Leachate Generation

EPA supplemented the data from the Surveys with data from the facility schematics and with additional data received from the hazardous waste management industry. The total quantity of multi-source leachate generation reported from all available data sources is about 315 million gallons per year. This quantity constitutes a lower bound on the quantity of multi-source leachate actually generated.

A.5.2 Multi-Source Leachate Management

As mentioned in Section A.3.2, EPA used data from the TSDR and Generator Surveys, as well as data submitted by the hazardous waste management industry to characterize the management of multi-source leachate. Understanding the fate of multi-source leachate after it has been generated is a critical step in determining the volumes of multi-source leachate currently land placed.

The management of multi-source leachate depends primarily on the physical form of the leachate and its chemical composition. Facility schematics indicate that the primary management practices for multi-source leachate are disposal of the wastewaters under a National Pollutant Discharge Elimination System (NPDES) permit or discharge to a publicly owned treatment works (POTW). The remaining volumes are land placed and are subject to the LDRs.

Based on data submitted in the TSDR and Generator Surveys, including the facility schematics and additional data submitted by industry, EPA estimates that at least 56.9 million gallons of multi-source leachate are land placed annually (this includes surface disposal and deep-well volumes). This is approximately an 18 percent increase over the volume reported in the proposed rule (48.2 million gallons). These volumes will require alternative treatment or recovery capacity as a result of the LDRs. They are examined in more detail in the next section.

A.5.3 Volumes Requiring Alternative Treatment or Recovery Capacity

EPA made BDAT determinations for two categories of multi-source leachate: wastewaters and nonwastewaters. Multi-source leachate containing both organic and inorganic constituents must meet the standards set for both sets of constituents.

EPA determined that the majority of all multi-source leachate wastewater contains both organic and inorganic constituents. For these wastewaters, therefore, EPA is promulgating treatment standards primarily based on biological treatment followed by chemical precipitation or wet air oxidation followed by carbon adsorption followed by chemical precipitation.

Table A-1 presents the volumes of multi-source leachate that are currently land placed. The Table shows that 73 percent of the multi-source leachate that is land disposed goes to surface disposal (41 million gallons). Approximately 15 million gallons of wastewater goes to deep-well injection.

Table A-2 presents the volumes of multi-source leachate that require alternative treatment or recovery capacity. These volumes differ from the Table A-2 volumes because they include residuals generated during the treatment of leachate that still may require further treatment. For example, ash from an incinerator that handles nonwastewater multi-source leachate will require stabilization.

A.5.4 Determination of Variances

Table A-3 presents the capacity available for treating multi-source leachate. The available capacity is shown for the BDAT technologies recommended for the treatment of multi-source leachate.

EPA compared the volumes of multi-source leachate requiring alternative treatment or recovery capacity presented in Section A.5.3 with the available capacity for the appropriate technologies presented in Table A-3. Table A-4 shows the results of this comparison for multi-source leachate that is surface disposed and Table A-5 shows the results of this comparison for multi-source leachate that is deep-well injected.

EPA analyzed the alternative treatment or recovery capacity for two categories of multi-source leachate: wastewaters and nonwastewaters. Treatment standards for wastewaters are based primarily on biological treatment or wet air oxidation and carbon adsorption for organic constituents, and chemical precipitation for inorganic constituents. Given that there are very low volumes of surface-disposed multi-source leachate wastewaters and because there is adequate capacity to treat these wastes using the above treatment technologies, EPA is not granting a national capacity variance for surface-disposed multi-source leachate wastewaters.

Concentration standards for nonwastewaters are based primarily on incineration for wastes containing organic constituents and on stabilization for wastes containing inorganic constituents. EPA is granting a two-year variance for surface-disposed multi-source leachate nonwastewaters.

The determination of variances for surface-disposed nonwastewaters was based on the analysis of a limited number of facilities with complete information on generation and management of leachate. In addition to the volumes included in the analysis, volumes of multi-source leachate and residuals from management of leachate (e.g., wastewater treatment residuals) are generated. However, these volumes do not affect the national capacity variances since the limited data available from other facilities indicated a similar pattern of management of leachate: wastewaters are managed at wastewater treatment facilities and non-wastewaters (e.g., residuals) are land disposed. For these additional facilities, the information available was not adequate for inclusion in the quantitative analysis, but there was often sufficient information to determine the type of management for multi-source leachate. EPA chose to use only data from facilities with adequate information to establish a firm basis for the evaluation of variances.

The analysis of the quantitative data indicates a need for a variance for sludge/solid residuals needing incineration. The general information from other facilities clearly indicates that additional quantities of sludge/solid residuals are being generated and land disposed. However, these volumes are already in the variance category.

EPA is estimating that multi-source leachate containing both organic and inorganic constituents are currently deep-well injected. The Agency is proposing a treatment standard for multi-source leachate wastewaters based primarily on biological treatment followed by chemical precipitation, or wet-air oxidation followed by carbon adsorption followed by chemical precipitation for wastes containing organic and inorganic constituents. Because there is insufficient capacity to treat wastewaters based on these treatment technologies, EPA is proposing to grant a two-year variance for multi-source leachate that is deep-well injected.

Table A-1

VOLUMES OF MULTI-SOURCE LEACHATE LAND DISPOSED

Multi-Source Leachate Category	Surface Disposal	Deep Well Disposal	Total
Wastewaters	800,000	15,100,000	15,900,000
Nonwastewaters	41,000,000	0	41,000,000
TOTAL VOLUME	41,800,000	15,100,000	56,900,000

Table A-2

VOLUMES OF MULTI-SOURCE LEACHATE REQUIRING ALTERNATIVE TREATMENT OR RECOVERY CAPACITY

Multi-Source Leachate Category	Surface Disposal	Deep Well Disposal	Total
Wastewaters	800,000	15,100,000	15,900,000
Nonwastewaters	45,810,000	300,000	46,110,000
TOTAL VOLUME	46,610,000	15,400,000	62,010,000

Table A-3

AVAILABLE CAPACITY FOR TECHNOLOGIES RECOMMENDED FOR TREATING MULTI-SOURCE LEACHATE

Multi-Source Leachate Category	BDAT Technology	Available Capacity (million gals/year)
Organic/Inorganic Wastewaters	Wet Air Oxidation followed by Carbon Adsorption followed by Chemical Precipitation	0
	or	
	Biological Treatment followed by Chemical Precipitation	13.9
Organic/Inorganic Wastewaters	Combustion of Sludges/ Solids followed by Stabilization	21.9
Inorganic Nonwastewaters	Stabilization	478

Table A-4

REQUIRED ALTERNATIVE COMMERCIAL TREATMENT/RECYCLING CAPACITY FOR SURFACE-DISPOSED MULTI-SOURCE LEACHATE

(million gallons/yr)

Technology	Available Capacity	Required Capacity	Variance
Organic/Inorganic Wastewaters			
Wet Air Oxidation followed by Carbon Adsorption followed by Chemical Precipitation or	0	<1	NO
Biological Treatment followed by Chemical Precipitation	13.9		
Organic/Inorganic Nonwastewaters			
Combustion of Sludges/Solids followed by Stabilization	21.9	41	YES
Inorganic Nonwastewaters			
Stabilization	478	4.8	NO

Table A-5

REQUIRED ALTERNATIVE COMMERCIAL TREATMENT/RECYCLING CAPACITY FOR DEEP-WELL DISPOSED MULTI-SOURCE LEACHATE

(million gallons/yr)

Technology	Available Capacity	Required Capacity	Variance
Organic/Inorganic Wastewater			
Wet Air Oxidation followed by Carbon Adsorption followed by Chemical Precipitation	0	15.1	YES
or			
Biological Treatment followed by Chemical Precipitation	13.1		

A.5.5 Attachments

Attachment A summarizes the data used in this analysis by facility. Exhibit A-1 presents the volumes of multi-source leachate surface-disposed as well as volumes for which there was generation information but where surface-disposed volumes did not exist or could not be identified. Exhibit A-2 presents the volumes of multi-source leachate deep-well-disposed.

Attachment B presents EPA's detailed analysis of each facility examined which reported generating or disposing of multi-source leachate. The analysis is presented in three sections. Section B-1 discusses facilities with surface-disposed volumes. Section B-2 discusses facilities with deep-well volumes. Section B-3 discusses facilities for which no land disposed volumes of multi-source leachate were identified.

Attachment C presents phone logs of conversations with facilities that took place during the analysis.

ATTACHMENT A

PRESENTATION OF DATA

SUMMARY OF DATA

EXHIBIT B.1

MULTI-SOURCE LEACHATE (F039)
SURFACE-DISPOSED VOLUMES (GAL/YEAR)

THIRD THIRD FINAL RULE

06-May-90

07:13 PM

EPA ID	FACILITY NAME	TOTAL LEACHATE GENERATED	INORGANIC NONWASTEWATER	POTENTIALLY ORG. & INORG. WASTEWATER	POTENTIALLY ORG. & INORG. NONWASTEWATER
ALD000622464	Chemical Waste Management	485,690		485,690	
CAD000060012	IT Corp, Panoche Facility	24,024,000			2,860,800
CAD053049490	Stauffer Chemical	7,929,120			500,000
ILD010284248	Chem Waste Mgt - CID landfill	7,810,899			5,572,776
ILD074411745	ESL Inc.	304,100			10,000
LAD000618256	Cecos International				411,360
MID980617435	Dow Chemical, Salzburg Landfill	160,800			160,800
NJD002385730	DuPont Chambers Works	69,888,000			20,640,000
NYD000818419	Ciba-Geigy Corp	2,966,000			1,604,160
NYD002080034	GE Waterford	250,000			5,714,400
NYD060545209	Al Tech Specialty Steel	5,228,880			300,000
NYD080336241	Cecos International Inc.	6,976,080			168,000
OHD087433744	Cecos International Inc.	4,750,000			200,000
OKD065383376	USPCI	4,194,000			20,000
PAD000429589	GROWS, Inc	11,257,125			129,360
PAD000443705	Western Berks Refuse Authority LF	3,244,730			200,000
PAD004835146	Mill Service, Yukon Plant	22,000,000	48,000		
PAD059087072	Mill Service, Inc.	27,118,800	240,000		
PRD980594618	Union Carbide Caribe, Inc	1,825,000			29,280
SCD070375985	GSX Services of South Carolina	282,960			1,200
TXD000835249	Gulf Coast Waste Disposal	312,000		312,000	
TXD069452340	Texas Ecologists, Inc.	890,000			53,193
WVD005005509	Union Carbide Agric. Prod.				258,480
	Casmalia Resources	1,009,500			50,000
	Dow - Michigan Division WWTP	4,320,000			1,440,000
	Browning Ferris				150,000
	Envirosafe - Ohio	7,500,000			247,440
	Envirosafe - Idaho	100,000			3,360
	GSX - Ohio				499,200

EXHIBIT B.1

MULTI-SOURCE LEACHATE (F039)
SURFACE-DISPOSED VOLUMES (GAL/YEAR)

THIRD THIRD FINAL RULE

06-May-90
07:13 PM

EPA ID	FACILITY NAME	TOTAL LEACHATE GENERATED	INORGANIC NONWASTEWATER	POTENTIALLY ORG. & INORG. WASTEWATER	POTENTIALLY ORG. & INORG. NONWASTEWATER
The following facilities reported no surface-disposed volumes.					
ALD004019048	Monsanto Co. Anniston Facility	102,766			
CAD069130995	Hewlett-Packard Co.	1,741,000			
MDD000797365	BFI	508,200			
MID005068507	Sundstrand Heat Transfer, Inc				
MID048090633	Wayne Disposal Inc Site #2	2,600,000			
MID980568711	Ford Motor Co., Allen Park	1,500,000			
MOD068521228	B.H.S., Inc	155,000			
OHD068111327	Evergreen Landfill	175,680			
PRD090028101	Merck, Sharp & Dohme, Quimica de	34,853,520			
TXD055141378	Rollins Environmental Services	12,096,000			
WID076171008	Land Reclamation ltd	4,000,000			
WID098547854	Metro LF and Dev. Project	7,878,000			
	TOTALS:	280,437,850	288,000	797,690	41,223,809
	DEEP-WELL TOTAL:	34,643,667			
	TOTAL F039 GENERATION:	315,081,517			

Data Sources: TSDR and Generator Surveys and Data Submitted by Industry

EXHIBIT B.2

MULTI-SOURCE LEACHATE (F039)
DEEP-WELL DISPOSED VOLUMES (GAL/YEAR)

THIRD THIRD FINAL RULE

06-May-90
07:13 PM

EPA ID	FACILITY NAME	TOTAL LEACHATE GENERATED	POTENTIALLY ORG. & INORG. WASTEWATER
LAD000618298	Cecos International Inc.	3,250,000	3,250,000
LAD010395127	Rollins Environmental Services	17,210,880	3,341,520
	Gulf Coast Waste Disposal Auth.	1,500,000	1,500,000
CBI*		12,682,787	7,020,160
	TOTALS:	34,643,667	15,111,680

*Data from CBI facilities have been aggregated with those from several non-CBI facilities in order to protect the confidential nature of the information.

Data Sources: TSDR and Generator Surveys and Data Submitted by Industry

ATTACHMENT B

PRESENTATION OF DATA

ANALYSIS OF FACILITY DATA

SECTION B-1
Facilities with Surface-Disposed Multi-Source Leachate

This Section presents the information on facilities reporting both the generation and the surface disposal of multi-source leachate, along with the rationale for including the volumes of multi-source leachate requiring alternative treatment capacity in the analysis.

ALD00622464 Chemical Waste Management

Evaluation of the generation and management of multi-source leachate at this facility involved analysis of the TSDR and Generator Surveys. Information in the TSDR Survey, including its schematic, were classified as Confidential Business Information (CBI) for this facility. Data in the Generator Survey, not classified as CBI, indicated that 485,000 gallons of multi-source leachate are generated. The Generator Survey also reported that the entire volume generated was land disposed on-site. The presence of both organic and inorganic constituents is indicated by the data, and the listed volume of 100 percent water content was used to classify the waste as wastewater. Thus, 485,000 gallons were assigned as organic/inorganic wastewater that is surface disposed.

CAD000060012 IT Corp., Panoche Facility

Evaluation of survey data showed that approximately 24 million gallons of multi-source leachate are generated. The survey data did not clearly identify leachate treatment or generation of leachate treatment residuals. The facility's Generator Survey response did, however, report the on-site management of leachate in a solar evaporator unit. Based on the TSDR Survey for this facility, it was determined that two solar evaporators generate 5960 tons of sludge/solid residuals each. These residuals are derived from the treatment of a liquid stream that included multi-source leachate. EPA assumed that these sludge/solid residuals (2,860,800) were surface-disposed and are, therefore, an organic/inorganic nonwastewater leachate volume requiring alternative treatment.

CAD053049490 Stauffer Chemical

Evaluation of survey data showed that approximately 8 million gallons of multi-source leachate are generated. The survey data indicated that a portion of the leachate is treated by chemical precipitation in an exempt wastewater treatment unit (i.e., tanks). After treatment, liquid wastes are discharged under an NPDES permit. Residuals from this treatment, along with the remainder of the leachate volume, undergo further treatment in a surface impoundment. The facility indicated that treatment in the surface impoundment would be replaced in the future by a wastewater treatment system. EPA assumed that leachate treatment residuals are generated at this facility, regardless of which wastewater system is in place. In order to approximate the quantity of these residuals, EPA used a formula provided by Envirosafe Management Services, Inc.[1] EPA estimated that approximately 500,000 gallons on organic/inorganic nonwastewaters derived from leachate treatment will require alternative treatment capacity.

ILD010284248 Chemical Waste Management - CID Landfill

The survey data indicated that approximately 7.8 million gallons of multi-source leachate are generated at this facility. Both organic and inorganic constituents are present in the leachate. The survey data show that several treatment technologies are applied to the entire leachate volume. After treatment, liquid wastes are discharged to a POTW under an NPDES permit. Waste treatment sludges, which amount to approximately 5.6 million gallons, are land disposed in an on-site landfill. The volume land disposed is included in this capacity analysis as a multi-source leachate treatment residual requiring alternative treatment.

ILD074411745 ESL Inc.

According to survey data, this facility generated approximately 300,000 gallons of multi-source leachate in 1986. The survey data indicated that the leachate is treated on-site, then discharged to a POTW under a NPDES permit. The facility provided no information on treatment residuals. EPA assumed that residuals are generated and undergo surface disposal. EPA estimates that 10,000 gallons of sludge are generated through the treatment of leachate at this facility.

LAD000618256 Cecos International, Inc.

This facility currently manages its leachate through deep-well injection, and is discussed in more detail in Section B-2. Upon review of the TSDR Survey for this facility, however, EPA determined that approximately 400,000 gallons of dewatered sludge and filter cartridges are derived from the treatment of leachate and other wastewaters prior to deep-well injection. These wastes are sent off-site for disposal, and are assumed to require alternative treatment capacity for organic/inorganic nonwastewater leachate.

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[1] In a letter to Barbara McGuiness of DuPont, Chambers Works (this letter was subsequently forwarded to EPA and is included in the Public Docket for this rule), Envirosafe provided a formula for calculating sludge generation rates that uses a factor of 275 lbs. of sludge generated per 1,000 gallons leachate treated. EPA used this factor to approximate the amount of sludge generated through leachate treatment when this informational was unavailable.

MID980617435 Dow Chemicals Salzburg Landfill

The survey data indicated that 670 tons (160,800 gallons) of leachate-contaminated soils are disposed in an on-site hazardous waste landfill. The survey data also indicated that 9.5 million gallons of leachate are generated from the landfill and accumulated in tanks regulated under the 90-day rule, and are sent off-site to a wastewater treatment plant operating under an NPDES permit. The only surface-disposed volume included for this facility was the 160,800 gallons of multi-source leachate contaminated soil reported in the survey.

NJD002385730 DuPont Chambers Works

The facility schematic from the TSDR Survey indicated that approximately 70 million gallons of waste is contaminated with multi-source leachate and must be treated. DuPont has submitted data indicating that it generates 240 wet tons/day (approximately 20 million gallons/year) of primary and secondary sludge. This sludge is currently being landfilled on-site. In the future, leachate and groundwater will be segregated, and secondary sludges will be incinerated until an on-site carbon regeneration furnace is on-line. For this analysis, the waste volume being land disposed (20,640,000 gallons) has been included as organic/inorganic nonwastewater leachate. EPA received a letter from this facility confirming that both primary and secondary sludges derived from the treatment of multi-source leachate would continue to be surface-disposed after May 8, 1990.

NYD000818419 Ciba-Geigy Corp

The survey data indicated that approximately 3 million gallons of multi-source leachate is generated by this facility. The survey data also indicated that all generated leachate is sent off-site to a wastewater pre-treatment facility. Using the TSDR Survey response for this facility, EPA determined that the leachate was sent to another Ciba-Geigy facility (EPA ID NYD098334618) for pre-treatment. Residual from this process were indicated as 6684 tons (1,604,160 gallons) per year. This residual volume was included in the analysis as organic/inorganic nonwastewater leachate.

NYD002080034 GE Waterford

The TSDR Survey schematic for this facility indicated that 1,815 gallons per minute (approximately 954 million gallons per year) of leachate from the on-site landfill is sent to an on-site wastewater treatment system. The survey response, however, indicated that only 250,000 gallons of leachate were generated. EPA used the information in the schematic for this analysis. From the wastewater treatment system schematic, it was determined that 23,810 tons (approximately 5.7 million gallons) of dewatered sludge are sent to a landfill. Because this volume was derived from the treatment of at least some multi-source leachate, it was included in this analysis as organic/inorganic nonwastewaters requiring alternative treatment.

NYD060545209 Al Tech Specialty Steel

The survey data indicated that approximately five million gallons of multi-source leachate are generated at this facility. The survey data indicated that the leachate from an on-site landfill is sent to a wastewater treatment system where the wastewater is subjected to chromium reduction, chemical precipitation, and vacuum filtration. The resulting dewatered sludge is disposed in an on-site landfill, and the effluent is discharged under an NPDES permit. The dewatered sludge is reported by the facility as being non-hazardous. EPA assumed, however, that the treatment train used may not meet all BDAT standards for multi-source leachate. EPA estimated that 500,000 gallons of sludge may require alternative treatment.

NYD080336241 Cecos International Inc.

The survey data indicated that approximately seven million gallons of multi-source leachate are generated by this facility. These wastes are treated on-site and the effluent sent to a POTW. Additional information submitted by Cecos/BFI indicated that approximately 168,000 gallons of filter-pressed bio-sludge from wastewater treatment is sent off-site for regeneration and land disposal. This waste volume has been included in the analysis.

OHD087433744 Cecos International, Inc.

The survey data indicated that approximately 5 million gallons of multi-source leachate are generated at this facility. The data, however, provided no information of the management of these wastes. Upon contacting the facility, EPA determined that roughly 5 percent of this volume (250,000 gallons) is sent off-site to a deep-well facility. The remainder is sent off-site to various wastewater treatment systems. EPA assumed that these off-site systems generate residuals that may require alternative treatment. EPA estimates that 200,000 gallons of organic/inorganic nonwastewaters derived from the treatment of this facility's leachate may require alternative treatment capacity.

OKD065438376 USPCI

The survey data indicated that approximately four million gallons of multi-source leachate is generated by this facility. The facility stabilizes on-site wastewater treatment sludges. This could possibly meet the treatment standard for inorganic nonwastewaters, however, this would not meet the treatment standard for organic wastewaters. EPA assumed, therefore that the treatment of this leachate volume in a wastewater treatment system would generate roughly 20,000 gallons of sludge requiring alternative treatment. EPA recognizes that the current treatment system used at this facility may meet BDAT standards. THe affect of using the 20,000 gallon approximation, however, will not affect the outcome of the capacity analysis.

PAD000429589 Grows, Inc.

The survey data indicated that approximately 11 million gallons of multi-source leachate are generated by this facility. The survey data also indicated that 539 tons (approximately 130,000 gallons) of filter cake from the wastewater treatment plant is sent to an off-site landfill without treatment. This filter cake may require treatment as a nonwastewater prior to disposal and, therefore, has been included in this analysis. The remaining effluent is discharged under an NPDES permit and is, therefore, not included in this analysis.

PAD000443705 Western Berks Refuse Authority

The survey data indicated that approximately three million gallons of multi-source leachate are generated by an on-site landfill. The survey data identified that the generated leachate is sent by tank truck to an off-site hazardous waste treatment plant. EPA assumed this off-site facility generates treatment residuals that will require alternative treatment. EPA estimates this volume to be roughly 200,000 gallons.

PAD004835146 Mill Service Yukon Plant

The survey data indicated that approximately 22 million gallons of multi-source leachate are generated by this facility. The survey data also indicated that the multi-source leachate is discharged to a POTW after treatment. Data recently submitted to EPA by the facility indicate that 200 tons (48,000 gallons) of metal hydroxide treatment residuals are generated and disposed. In the analysis, 48,000 gallons of inorganic nonwastewater multi-source leachate treatment residuals were identified as being surface-disposed at this facility.

PAD059087072 Mill Service, Inc.

The survey data indicated that approximately 27 million gallons of multi-source leachate are generated by an on-site surface impoundment. The leachate is treated on-site, with treatment effluent discharged under a NPDES permit, and treatment sludges returned to an on-site surface impoundment. This facility supplied updated information to EPA indicating that 1,000 tons (240,000 gallons) of metal hydroxide sludges are generated and land disposed. These treatment residuals were included in the analysis as inorganic nonwastewaters.

PRD980594618 Union Carbide Caribe, Inc.

The survey data indicated that approximately two million gallons of leachate were generated by this facility. The leachate is treated on-site with the treated effluent being discharged under an NPDES permit. No leachate residual volumes were reported land disposed by the facility. Upon review of the TSDR Survey for this facility, however, EPA determined that 29,280 gallons of dewatered sludge carrying the same waste codes as the multi-source leachate were returned to the landfill. Although the facility indicates that the sludge is non-hazardous, EPA believes that the sludge may not meet all BDAT standards for multi-source leachate. This volume, therefore, has been included in the analysis.

SCD070375985 GSX Services of South Carolina

The survey data indicated that approximately 280,000 gallons of leachate were generated, and 1,200 gallons land disposed on-site. The survey data indicated that on-site treatment is available. It was assumed that the 1,200 gallons of waste are leachate treatment residuals, and have been included in the analysis.

TXD000835249 Gulf Coast Waste Disposal

The survey data indicated that approximately 312,000 gallons of multi-source leachate are sent to on-site land treatment. The survey data also indicated that this practice was to have stopped in 1988. Because it is uncertain if this practice has stopped, the 312,000 gallons of leachate in the form of organic/inorganic wastewater have been included in this analysis.

TXD069452340 Texas Ecologists, Inc.

The survey data indicated that 890,000 gallons of multi-source leachate were generated from an on-site landfill. U.S. Ecology submitted data indicating that this Texas facility generates solid residuals from the treatment of leachate and contaminated groundwater. An estimated 48,000 gallons of leachate treatment residuals are generated on an annual basis. The company is currently working on a "no migration" petition for two Class I injection wells with the intent of deep-well disposing of site-generated leachates and groundwater. For this analysis, however, the leachate treatment residual volumes have been included.

WVD005005509 Union Carbide Agricultural Production Company

The survey data indicated that approximately one million gallons of multi-source leachate were generated. The survey data also indicated that leachate is treated in a wastewater system prior to discharge under an NPDES permit. Approximately 258,000 gallons of hazardous wastewater treatment sludge is disposed either in a landfill or off-site in a surface impoundment. Although this volume resulted from biological treatment, it could not be determined if all BDAT standards could be met. This volume, therefore, has been included in the analysis.

Casmalia Resources

Casmalia Resources submitted data on leachate generation. The facility recently lost the use of its surface impoundments and plans on replacing them with a chemical fixation system. The amount of leachate to be stabilized is approximately one million gallons per year. EPA assumed that this treatment would not meet all BDAT standards for multi-source leachate. Assuming the waste could be treated in a wastewater treatment system, EPA added 50,000 gallons of treatment residuals to the analysis.

Dow Chemical Company, Michigan Division

Dow Chemical submitted data indicating that its Michigan Division Wastewater Treatment Plant generates both primary and secondary solids from the treatment of multi-source leachate. Approximately three million gallons of primary solids are generated from clarification of wastewater treatment plant's influent stream. Approximately one million gallons of secondary solids are generated from wasting of activated sludge from the aeration basin. Primary solids are treated on-site by incineration. Secondary solids are land disposed. This volume of secondary solids, therefore, has been included in the capacity analysis.

Browning Ferris Industries

Information submitted as part of the Leachate Treatability Study Plan (see section A.2.3) indicated that 150,000 gallons of leachate treatment residuals are generated by BFI. Although this information was not connected to a particular facility, the Study Plan data have been accepted by EPA and the volume is included in the analysis.

Envirosafe Services of Ohio, Inc.

Envirosafe Services of Ohio, Inc. submitted data on the generation of leachate treatment residuals. The facility projected generating 1,031 tons of leachate treatment sludge (247,440 gallons) in 1990. Although these treatment residuals are currently being sent off-site, no information was submitted on the off-site management of these treatment residuals. Therefore, they have been included in the analysis.

Envirosafe Services of Idaho, Inc.

Envirosafe Services of Idaho, Inc., submitted data on its projected estimates of leachate treatment residuals. The facility projected generating 14 tons of leachate treatment sludges (3,360 gallons) for 1990. The treatment sludges were originally placed in an evaporation impoundment meeting minimum technology requirements. This volume has been included in the analysis.

GSX Chemical Services of Ohio, Inc.

GSX Chemical Services of Ohio, Inc. submitted data indicating that it generates approximately 40 tons per week (499,200 gallons per year) of filter cake residuals from the treatment of multi-source leachate. The filter cake residuals are currently being surface-disposed. Their waste volumes, therefore, have been included in this analysis.

Section B-2
Facilities With Deep-Well Injected Multi-Source Leachate

This Section presents the analysis of facilities reporting both the generation and the deep-well disposal of multi-source leachate. For each of these facilities, a paragraph is included explaining the rationale for including volumes of multi-source leachate requiring alternative treatment capacity in the analysis.

LAD000618298 Cecos International, Inc.

The survey data indicated that approximately 3.25 million gallons of multi-source leachate are sent off-site for disposal to another facility containing a deep-well injection unit. Therefore, this volume was identified as being deep-well disposed.

LAD010395127 Rollins Environmental Services

According to the survey data, approximately 17 million gallons of multi-source leachate were generated at this facility. The survey data only reported the disposal of approximately 3 million gallons of leachate. Because the facility notes indicated that the leachate is sent to deep-well disposal, and because of the uncertainty of any other on-site management practices for leachate, only the reported 3 million gallons of leachate being land disposed was assigned to deep-well disposal.

Gulf Coast Waste Disposal Authority (GCWDA)

During the comment response to the Third Third proposed rule, GCWDA submitted data indicating that they are managing 1.5 to 1.8 million gallons of multi-source leachate through deep-well injection. 1.5 million gallons have been required to the required capacity estimate for deep-well disposal.

CBI Information

A portion of the deep-well injected volumes were classified as confidential business information. In order to respect the CBI facilities' requests that information remain confidential, EPA has aggregated their data with that from several non-CBI facilities. Detailed descriptions of these CBI and non-CBI data are not included in this discussion.

Section B-3
Facilities Reporting No Land Disposed Multi-Source Leachate

This section presents the available data for facilities that reported generation of multi-source leachate but which, for various reasons, do not result in land disposal. The following facility profiles identify the reasons for not including volumes of multi-source leachate requiring alternative treatment capacity at these facilities.

ALD004019048 Monsanto Co. Anniston Facility

Evaluation of survey data showed that 103,000 gallons of multi-source leachate were generated at this facility. Survey notes indicate that multi-source leachate undergoes biological treatment. The survey reported that treatment residuals leaving the treatment unit are delisted. Therefore, no volumes of multi-source leachate were identified as being land disposed at this facility.

CAD069130995 Hewlett-Packard Co.

Evaluation of survey data showed multi-source leachate being treated by a groundwater treatment system. The survey data indicated that approximately 1.74 million gallons of leachate were treated by air stripping. Non-hazardous waste effluent is being discharged under an NPDES permit. No multi-source leachate were indicated as being land disposed at this facility and no nonwastewater treatment residuals were reported generated.

MDD000797365 BFI

The survey data identified approximately 500,000 gallons of multi-source leachate generated at this facility. The only on-site leachate management practices identified were accumulation and storage in tanks. Because of the uncertainty of leachate management and solid treatment residual generation, no leachate waste volumes were identified as requiring alternative treatment for this facility in the analysis.

MID005068507 Sundstrand Heat Transfer, Inc.

Investigation of the survey data indicated that approximately 735 million gallons of contaminated ground water were treated in an on-site wastewater treatment system. The survey data indicated that the leachate resulted from the contamination of ground water by leaking on-site tanks. These tanks contained only F002 wastes. The contaminated ground water resulting from leaking tanks containing only a single RCRA waste were considered single-source leachate. Consequently, because the waste did not fit the definition of multi-source leachate, this volume was not included in the analysis.

MID048090633 Wayne Disposal Inc, Site # 2

The survey data identified approximately three million gallons of multi-source leachate generated by this facility. The survey data also indicated that the multi-source leachate is sent off-site to a POTW for treatment. Because POTWs are not subject to RCRA Subtitle C requirements, this volume is not included in the analysis.

MID980568711 Ford Motor Company, Allen Park

The survey data identified approximately two million gallons of multi-source leachate generated. This multi-source leachate was reported discharged to a POTW without prior treatment. Because POTWs are not subject to RCRA Subtitle C requirements, this volume is not included in the analysis.

MOD068521228 B.H.S., Inc.

The survey data indicated that 155,000 gallons of multi-source leachate is generated at this facility. The survey data also indicated that between 1986 and 1987, leachate would be either treated by solar evaporation or sent off-site to a POTW, and that beginning in 1988 all leachate would be sent off-site to a POTW. Because POTWs are not regulated under Subtitle C or RCRA, this volume was not included in the analysis.

OHD068111327 **Evergreen Landfill**

The survey data indicated that 175,680 gallons of leachate are generated from an on-site landfill. The survey data also indicated that the leachate is discharged to a POTW after treatment, however, only accumulation in tanks was identified as an on-site management practice. No volumes from this facility were included in the analysis.

PRD090028101 **Merck, Sharp & Dohme, Quimica de Puerto Rico**

The survey data indicated that approximately 35 million gallons of multi-source leachate are generated from an on-site landfill at this facility. The survey data identified only F005, XASB, and non-hazardous wastes as being land disposed. Since the leachate generated by the landfill is not multi-source but single-source, the waste volume was not included in the analysis.

TXD055141378 **Rollins Environmental Services**

The survey data indicated that approximately 12 million gallons of multi-source leachate were generated by this facility. The survey data identified the following treatment processes for multi-source leachate: storage in tanks followed by on-site treatment, including activated sludges, lime precipitation, flocculation, and gravity thickening. Effluent from treatment is either discharged under an NPDES permit or recycled to incineration scrubbing. Treatment residuals are stabilized and disposed in an on-site landfill. Because of the uncertainty of the waste's composition, it was believed possible that the stabilized treatment residuals could meet BDAT standards, and, therefore, their waste volumes were not included in the analysis.

WID076171008 Land Reclamation Ltd.

The survey data indicated that approximately four million gallons of multi-source leachate are generated. The survey data also indicated that the leachate was discharged to a POTW without prior treatment.

WID098547854 Metro Landfill and Development Project

The survey data indicated that approximately eight million gallons of multi-source leachate are generated. The survey data also indicated that the leachate is accumulated in tanks then discharged to a POTW without prior treatment.

ATTACHMENT C

PHONE LOGS

The phone logs provided here outline discussions with facilities that were contacted due to uncertainty regarding multi-source leachate generation and management at the particular facility.

4/30/90 **Midwest Steel Co.** IND016584641

- When asked about multi-source leachate management at the facility, the contact responded that the landfill was a mono-fill, so the leachate is single-source.

4/30/90 **USPCI, Grassy Mountain, Utah** UTD991301748

- Lon Griffith indicated that a total of approximately 45 gallons per day of multi-source leachate are generated at the facility's three RCRA landfill cells.
- As of May 8, 1990, however, a treatment system will be in place that will meet the multi-source leachate concentration standards.
- All leachate will be managed on-site.

4/30/90 **Petroleum Waste, Inc. (under new ownership)** CAD980675276

- Marianna Buoni indicated that only 2 litres of leachate are generated per month at the facility.
- This volume was determined to be insignificant.

4/30/90 **Cecos International, Strasburg, Colorado** COD991300484

- Lillian DePrimo indicated that this was a new landfill that won't begin accepting waste until July 1990.
- No leachate generated at this facility.

4/30/90 **Cecos International, Zion, Illinois** ILD980700728

- Robert Fister was faxed several questions regarding leachate generation and management.
- The response was not received in time to be added to the analysis.

5/1/90 **Cecos International, Williamsburg, Ohio** OHD087433744

- Ron Lotter indicated that the leachate volume reported in the survey are approximately correct.
- Leachate is managed at several off-site facilities. Roughly 5 to 10 percent is managed through deep-well injection. The remainder is sent to off-site wastewater treatment plants or to off-site POTW discharge.

ATTACHMENT D

MULTI-SOURCE LEACHATE CLARIFICATION
LETTER SUBMITTED BY DuPONT
March 22, 1990

[illegible] REV 7-80

E. I. DU PONT DE NEMOURS & COMPANY
INCORPORATED
WILMINGTON, DELAWARE 19898

CHEMICALS AND PIGMENTS DEPARTMENT

March 22, 1990

Ms. Jo Ann Bassi
U.S. EPA
Office of Solid Waste
Washington, D.C. 20460

Dear Ms. Bassi:

In September of 1989, I wrote to you to describe the efforts Du Pont has underway at Chambers Works to manage residuals from treatment of leachate and contaminated groundwater after May of 1990. In that letter, I described a scheme which would segregate groundwater and leachate and divert those waste streams to the secondary treatment phase of the wastewater treatment plant; the secondary sludge could then be thermally treated, either on-site or off-site.

This scheme would be a stop-gap measure to allow Chambers Works to meet the land disposal restrictions standards in May of 1990. Over the longer term, we will be implementing thermal treatment for all Chambers Works solids residuals. Once this thermal treatment is in place, segregation of groundwater and leachate to secondary will no longer be necessary.

As you know, EPA has proposed to grant a two-year national capacity variance to solids residuals from treatment of groundwater and leachate. When this capacity variance is finalized, the substantial expenditures (estimated to be above $3 million) and disruption associated with segregating groundwater will be unnecessary.

In light of these substantially changed circumstances, we have deferred further work on segregation to secondary treatment. Because this represents a change from the position described in my September letter, I thought it necessary to inform you and your colleagues.

Sincerely,

B. J. McGuinness/gct
Barbara J. McGuinness
Regulatory Affairs
Consultant

BJM:gct

APPENDIX B

MIXED RADIOACTIVE WASTES CAPACITY ANALYSIS

APPENDIX B

MIXED RADIOACTIVE WASTE CAPACITY ANALYSIS

Mixed radioactive wastes are radioactive and are contaminated with RCRA hazardous wastes. Consequently, these wastes are subject to dual regulation; EPA standards apply to the RCRA hazardous portion and Nuclear Regulatory Commission (NRC) or Department of Energy (DOE) requirements apply to the radioactive portion.

The treatment standards promulgated as part of this Third Third Land Disposal Restriction (LDR) rule apply to RCRA wastes mixed with radioactive wastes. EPA, therefore, has undertaken an analysis of the generation and available alternative treatment capacity for mixed radioactive wastes in an effort to determine the need for a National Capacity Variance from the LDRs. This appendix outlines the analysis of mixed radioactive wastes that was performed, including the methodology used for evaluating the generation and capacity information. It also presents the results of the analysis and explains why EPA is granting a two-year national capacity variance to all surface-disposed mixed radioactive wastes.

This Appendix is essentially the same as that submitted for the Third Third proposed rule. Minor changes have been made corresponding to changes in the best demonstrated available technology (BDAT) for certain mixed radioactive wastes that have been made since the proposed rule. These changes had no effect on the capacity determinations for mixed radioactive wastes. As proposed, the final rule grants a two-year national capacity variance to all mixed radioactive wastes.

One commenter to the proposed rule requested that EPA clarify whether naturally-occurring radioactive materials (NORM) that are mixed with RCRA hazardous wastes are also being granted a national capacity variance. EPA responded to this comment by stating that NORM wastes do not fall under the definition of mixed RCRA/radioactive wastes as described in section B.1.1. As proposed, the national capacity variance would not have been granted to these wastes. EPA recognized, however, that insufficient alternative treatment capacity exists to handle RCRA hazardous wastes that are also radioactive. In this final rule, therefore, EPA is granting a two-year national capacity variance to RCRA hazardous wastes that are mixed with NORM wastes.

B.1 Background

B.1.1 Definition of Mixed Radioactive Waste

EPA has defined a mixed radioactive waste as any matrix containing a RCRA hazardous waste and a radioactive waste subject to the Atomic Energy Act (53 FR 37045, 37046, September 23, 1988). Because the radioactive and RCRA hazardous components of mixed radioactive wastes are often inseparable, mixed radioactive wastes are subject to dual regulation. Atomic Energy Act requirements apply to the radioactive portion of mixed radioactive wastes, and the Department of Energy (DOE) or the Nuclear Regulatory Commission (NRC) is responsible for promulgating and enforcing the requirements. RCRA standards apply to the hazardous components of these wastes, and EPA is responsible for promulgating and enforcing the standards.

B.1.2 Status of Mixed Radioactive Wastes in the LDR Program

Radioactive wastes that are mixed with spent solvents, dioxins, or California list wastes are subject to the land disposal restrictions already promulgated for those hazardous wastes. EPA determined that radioactive wastes that are mixed with First Third and Second Third wastes will be included in the Third Third rulemaking (40 CFR 268.12(c)). Thus, today's proposal addresses radioactive wastes that contain First Third, Second Third, and Third Third wastes.

B.1.3 Distinctions Based on Radioactivity

Radioactive wastes are often separated into groups according to their relative radioactivity (EPA, March 1987). These divisions include high-level wastes (HLW), transuranic (TRU) wastes, and low-level wastes (LLW). The processing of nuclear reactor fuels generates two types of HLW: One resulting from dissolving naval reactor fuel elements to recover enriched uranium; the other resulting from dissolving nuclear reactor fuel elements to recover uranium. HLW are generated in a liquid form, and most HLW have hazardous chemical characteristics (e.g., corrosivity and toxicity). HLW may also contain listed RCRA hazardous wastes. The primary hazard normally associated with HLW, however, is their intense radioactivity.

TRU wastes contain alpha-emitting transuranic isotopes with half-lives greater than 20 years. They also contain more than 100 nanocuries per gram of waste. TRU wastes are generated during the processing, shaping, and handling of plutonium-containing materials. TRU wastes can be solid (e.g., gloves, rags, and tools) or liquid and may contain listed or characteristic RCRA hazardous wastes.

LLW result from more varied processes than either HLW or TRU wastes. LLW are generated during a variety of activities, and several RCRA waste codes are potential LLW contaminants. Among the most significant LLW contaminants are organic chemicals, including liquid scintillation cocktails, and lead metals used for containers and shielding.

Regardless of the type of radioactive constituents that mixed radioactive wastes contain (i.e., high-level, low-level, or TRU), these wastes are currently subject to RCRA hazardous waste regulations, including applicable land disposal restrictions.

B.1.4 Types of Mixed Radioactive Waste Generators

For the purpose of the Third Third capacity analysis, mixed radioactive waste generators were separated into two groups: DOE facilities and non-DOE facilities. DOE facilities generate the largest quantities of mixed radioactive wastes of all groups. For this reason, the capacity analysis focused primarily on DOE facilities.

Most non-DOE facilities that generate mixed radioactive wastes are commercial operations. Federal agencies other than DOE, including the Department of Agriculture and the National Institutes of Health, generate mixed radioactive wastes that are similar to those generated by other non-DOE facilities. In general, non-DOE facilities can be grouped into the following categories:

- Nuclear power plants (e.g., boiling water and pressurized water reactors);
- Medical institutions (e.g., research and clinical activities);
- Academic institutions (e.g, non-medical research); and

- Industrial facilities (e.g., pharmaceutical, sealed source, and irradiator manufacturers, biotechnical manufacturers, spent fuel storage facilities, and waste processors).

B.2 Information and Data Sources

In support of this capacity analysis, EPA collected the available information on the generation, characterization, and management of mixed radioactive wastes.

B.2.1 Department of Energy Data

EPA recognized that a large amount of radioactive wastes generated at DOE facilities are contaminated with RCRA hazardous wastes. In cooperation with EPA, DOE provided data to EPA outlining the generation, treatment, and disposal of mixed radioactive wastes at DOE facilities. DOE provided these data in a series of tables for 21 DOE facilities. The data included volume of waste streams generated annually and in storage, current treatment capacity, and planned treatment. The majority of the capacity analysis for mixed radioactive wastes was based on these data.

B.2.2 Information on Non-DOE Mixed Radioactive Waste

In an effort to obtain as much information as possible on the characterization, generation, and management of non-DOE mixed radioactive wastes, EPA investigated several potential sources of information. These included hazardous waste management and generation surveys, summary reports on mixed radioactive waste generation and management, available state surveys and interstate compact surveys and reports, as well as phone contacts with several state, regional, and federal government officials and industry representatives. Attachment B-1 to this appendix outlines these sources of information in more detail.

Although EPA believes that the information collected for this analysis is the best available, EPA recognizes that the information on the quantities of mixed radioactive wastes generated and managed at non-DOE facilities could be improved. Consequently, in the proposed Third Third rule the Agency requested comments by interested parties on the current generation and management of mixed radioactive wastes. Commenters submitted information that supports the national capacity variance for mixed radioactive wastes.

B.3 Methodology for Analyzing DOE Data

After analyzing available information, EPA believes that the DOE data set represented the most accurate information on mixed radioactive wastes available. EPA also determined that the quantities of mixed radioactive wastes generated at DOE facilities constitute a significant portion of all mixed radioactive wastes generated. For these reasons, the capacity analysis focused primarily on the data provided by DOE. The following sections describe the methodology and assumptions used in the capacity analysis.

B.3.1 DOE Generation of Mixed Radioactive Waste

To estimate the quantity of DOE mixed radioactive wastes, DOE annual generation rates were combined with the quantities of untreated wastes currently in storage at DOE facilities (i.e., estimated inventory at the end of 1989). The annually-generated volumes and volumes in storage were combined because EPA assumed that all untreated wastes constitute a demand for treatment.

EPA used DOE estimates of these combined quantities. The DOE methodology for developing these numbers involved estimating the total inventory as of July 1989 and adding one half of the annual generation rate to estimate the total volume of each waste stream requiring treatment at the end of 1989.

B.3.2 Facility-by-Facility Analysis of DOE Mixed Radioactive Waste Generation

Analysis of the data provided by DOE involved grouping waste streams according to the applicable best demonstrated available technology (BDAT) at each DOE facility. A key issue in this analysis was how to address several of the DOE waste streams that contained more than one RCRA waste code, many with different BDATs. To prevent double-counting of waste quantities when grouping the wastes by treatability group, the streams were divided by assigning an equal portion of the quantities to each waste code (i.e., straight proportionality). For example, DOE may have provided a single volume (e.g., 20,000 gallons) for a stream called "wastewater treatment sludge," which contains D001, D008, D009, and D011. Using straight proportionality, each waste code would be assigned 5,000 gallons. Although this procedure may not be the most precise way of assigning volumes, EPA believes that the conclusion of this analysis would remain the same if another, more complex method was used.

B.3.3 DOE Treatment Capacity

Estimates of RCRA treatment capacity were developed using DOE-supplied data on each of the treatment units located at the various facilities. EPA determined whether the given treatment was a BDAT or BDAT equivalent for the particular wastes treated in that unit. DOE also provided considerable data on planned treatment units and their capacities. Because these units will not be operational until after 1992, they were not included in the capacity analysis for determining the need for a national variance.

B.3.4 Net Capacity at each DOE Facility

The estimates of mixed radioactive waste generation outlined above were compared to the available on-site treatment capacity to determine the net treatment capacity at each DOE facility for each treatment technology.

B.3.5 Net DOE Treatment Capacity

To determine the net DOE treatment capacity for each treatability group across all DOE facilities, aggregates of the quantities of wastes requiring a particular treatment were subtracted from the available capacity for that treatment.

B.4 Results of DOE Analysis

Analysis of the mixed radioactive waste generation data supplied by DOE shows that approximately 363 million gallons of radioactive waste mixed with First Third, Second Third, and Third Third RCRA wastes are affected by this proposed rule. A variety of waste types and RCRA waste codes are generated, and several treatability groups were identified. The results of the DOE data analysis are provided in a series of tables included in Attachment B-2 of this appendix. The following discussion outlines the major findings of the analysis and explains the Attachment B-2 tables in more detail.

The DOE data included 30 different First, Second, and Third Third RCRA waste codes. As Section B.3 discussed, the methodology used to analyze these data involved arranging the DOE wastes requiring the same BDAT into treatability groups. Tables B-2(a) through B-2(m) in Attachment B-2 provide facility-specific information on the volumes requiring treatment and the on-site treatment capacity for each treatability group. The on-site treatment capacity is based on treatment unit data provided by DOE for each site. In most cases, the capacity provided represents the "maximum" capacity of the unit. The "maximum" capacity is the capacity of the unit before subtracting any capacity currently being used. "Available" capacity refers to the amount of treatment capacity that a unit offers beyond any treatment that is currently taking place.

B.4.1 Stabilization

Table B-2(a) lists the on-site stabilization treatment capacity and the quantity requiring stabilization as treatment for each of the DOE facilities. In the proposed rule, EPA estimated that approximately 77.7 million gallons of DOE mixed radioactive wastes require stabilization treatment capacity. Because a portion of this volume requires the new BDAT of vitrification, approximately 14.1 million gallons have been reassigned from stabilization to vitrification. For this final rule, EPA estimates that 63.6 million gallons of mixed radioactive wastes will require stabilization. This volume accounts for approximately 40 percent of the non-soil and debris mixed radioactive wastes generated at DOE facilities that are affected by this rule. EPA has determined that DOE mixed radioactive wastes requiring stabilization include those containing D005, D006, D007, D008, and D011 nonwastewaters.

EPA determined that 14.4 million gallons of DOE mixed radioactive wastes contain lead (D008). This quantity is about 8.5 percent of all non-soil and debris mixed radioactive wastes generated by DOE that are affected by this rule.

- Based on brief waste descriptions, EPA determined that at least 155,000 gallons of solid lead generated by DOE require surface deactivation followed by encapsulation, which is discussed in Section B.4.2.

- EPA was unable to determine whether lead was in a solid, elemental form for 2.2 million gallons of mixed radioactive wastes and assigned this volume to the stabilization BDAT.

- EPA determined that 12 million gallons of mixed radioactive wastes containing lead do not fall into the new BDAT category. This volume was also assigned to stabilization.

A large amount of D009 (mercury) mixed radioactive wastes have been assigned to the stabilization treatability group. Although stabilization is not BDAT for D009 mixed radioactive wastes, a large amount of the D009 are within wastes that contain other metals for which stabilization is BDAT. Consequently the entire volumes of these streams were assigned to stabilization.

EPA determined that approximately 2.8 million gallons of stabilization capacity that is RCRA BDAT is available at DOE facilities. A stabilization capacity shortfall, therefore, exists for mixed radioactive wastes at DOE facilities.

B.4.2 Macroencapsulation of Radioactive Lead Solids as a Method of Treatment.

EPA currently assumes that LDR treatment standards and technologies that apply to non-radioactive hazardous waste also apply to the hazardous waste portion of mixed radioactive waste. In a few cases, however, EPA has determined that special treatment technologies may be required for mixed radioactive wastes because of the unique properties of the waste. One such case is solid lead (i.e., elemental lead) that has been radiologically contaminated. These wastes are commonly associated with lead shielding, "pigs," bricks, etc. In the proposed rule, EPA used surface deactivation followed by encapsulation as BDAT for this waste. In the final rule, this BDAR has been changed to "macroencapsulation of radioactive lead solids as a method of treatment." Analysis of the DOE data regarding lead wastes showed that at least 150,000 gallons of mixed radioactive wastes in the form of solid lead require this treatment, as shown in Table B-2(b).

DOE data indicated that solid lead mixed radioactive wastes were encapsulated at only one facility. The data, however, did not indicate that the waste first underwent surface deactivation at this facility. In addition, the DOE data did not identify any available capacity for this treatment. Even if BDAT treatment is being applied at that one facility, a capacity shortfall for surface deactivation followed by encapsulation currently exists at DOE facilities.

B.4.3 Combustion

Table B-2(c) provides the results of the analysis of DOE mixed radioactive wastes requiring combustion capacity. Data provided by DOE listed wastes containing the following waste codes that require combustion as treatment: D001, D012, D013, D014, D015, D016, D017, P068, U002, U019, U022, U213, U220, U226, and U239 wastewaters and nonwastewaters. In addition, volumes for wastes for which the waste codes were described only as "P's" and "U's" were assigned to the combustion treatability group.

Analysis of the DOE data showed that 1.6 million gallons of First Third, Second Third, and Third Third mixed radioactive wastes generated at DOE facilities require combustion capacity. This quantity is about one percent of the non-soil and debris mixed radioactive wastes generated at DOE facilities affected by this rule.

On-site combustion capacity at DOE facilities is listed as zero gallons in all cases in Table B-2(c). Unlike the other tables, which list the "maximum" capacity for on-site treatment units, the combustion capacities listed in this table represent "available" capacity. Although DOE does have operational combustion facilities, EPA has assigned their capacity to mixed radioactive wastes other than those containing First Third, Second Third, or Third Third wastes. For the purposes of the capacity analysis for the Third Third rule, therefore, available DOE combustion capacity for those radioactive mixed wastes affected by this rule is zero.

B.4.4 Incineration as a Method of Treatment

In the proposed rule, EPA has proposed incineration with ash stabilization as BDAT for mixed radioactive wastes in the form of hydraulic oils containing mercury (D009). In the final rule, this BDAT has been changed to "incineration as a method of treatment." During analysis of the DOE data, the generation of these wastes could not be distinguished from the generation of other D009 mixed radioactive wastes. Specific generation numbers, therefore, could not be developed. No incineration/ash stabilization treatment capacity was identified, so a capacity shortfall for this technology currently exists at DOE facilities.

B.4.5 Neutralization

Table B-2(d) provides data mixed radioactive wastes requiring neutralization as treatment at DOE facilities. Mixed radioactive wastes exhibiting the characteristic of corrosivity (D002) were identified in the DOE data. These wastes require neutralization as BDAT. Analysis of the DOE data showed that 26.2 million gallons of DOE mixed radioactive wastes require neutralization. This quantity accounts for 15 percent of all non-soil and debris mixed radioactive wastes generated by DOE affected by this rule.

The DOE data did not contain any specific capacity information for neutralization. The data, however, indicated that several D002-containing waste streams are currently being neutralized. In these cases, EPA has used the annual generation rate as the annual treatment capacity. Although this is an indirect method of estimating treatment capacity, this method does not affect the outcome of this capacity analysis. Even with the treatment capacities assigned in this way, a DOE capacity shortfall of nearly 26 million gallons was calculated.

B.4.6 Vitrification

Table B-2(e) addresses vitrification. DOE mixed radioactive wastes requiring vitrification include D004 and D010 nonwastewaters. In addition, EPA is promulgating "vitrification of high-level radioactive waste as a method of treatment" for high-level radioactive mixed wastes generated during the reprocessing of fuel rods. This second category was not included in the proposed rule, but has been added to the final rule based on data submitted by DOE. These wastes are generated at six DOE facilities, in a combined amount of 14 million gallons. Although the DOE data included information on planned vitrification facilities, no operational vitrification capacity was determined to be available. Thus, there is a DOE capacity shortfall for this technology.

B.4.7 Alkaline Chlorination

Table B-2(f) provides data on DOE mixed radioactive wastes that require alkaline chlorination. Approximately 800,000 gallons of non-explosive D003 wastes (reactive characteristic) were identified as requiring this treatment. This quantity accounts for 0.5 percent of non-soil and debris DOE mixed radioactive wastes affected by this rule.

No alkaline chlorination capacity is available at DOE facilities. Thus, there is a DOE capacity shortfall.

B.4.8 Treatment of Reactives

Table B-2(g) provides data on DOE mixed radioactive wastes requiring treatment of reactives. Analysis of DOE data identified explosive D003 wastes (reactive characteristic) in this category. These wastes were reported as generated at only one DOE facility, which indicated that 5,000 gallons require treatment. No treatment of reactives capacity was identified during the analysis. Thus, there is a DOE capacity shortfall this technology.

B.4.9 Chemical Precipitation

Table B-2(h) provides data on DOE mixed radioactive wastes requiring chemical precipitation. Approximately 12,000 gallons of mixed radioactive wastes require chemical precipitation capacity, including D004, D005, D006, D008, D009, D010, and D011 wastewaters.

No chemical precipitation treatment capacity was identified in the analysis of DOE data. There is a capacity shortfall for chemical precipitation currently exists at DOE facilities.

B.4.10 Sulfide Precipitation

Sulfide precipitation is BDAT for mixed radioactive wastes containing mercury (D009). Table B-2(i) provides information on D009 mixed radioactive wastewaters at DOE facilities. Approximately 51.6 million gallons of D009 mixed radioactive wastes were identified, accounting for approximately 30 percent of all non-soil and debris DOE mixed radioactive wastes. No sulfide precipitation treatment capacity was identified, so a DOE capacity shortfall currently exists.

B.4.11 Amalgamation as a Method of Treatment

Originally proposed as "amalgamation with zinc," EPA is promulgating "amalgamation as a method of treatment" in this final rule for mixed radioactive wastes containing elemental mercury (D009 or U151). It was difficult to determine, from the DOE data, the quantity of DOE wastes that require this treatment. Table B-2(j) provides information on streams that could be identified.

Amalgamation capacity was not identified in the DOE data, so a DOE shortfall in capacity currently exists.

B.4.12 Metals Recovery

Table B-2(k) provides data on DOE mixed radioactive wastes requiring metals recovery as treatment. Approximately 200,000 gallons of P015 wastes (beryllium dust) require metals recovery treatment at DOE facilities. This figure accounts for less than one percent of all non-soil and debris DOE mixed radioactive wastes affected by this rule.

EPA's analysis of DOE data identified no metals recovery capacity. Therefore, there is a capacity shortfall for this technology.

B.4.13 Chromium Reduction followed by Chemical Precipitation

Table B-2(l) provides data on DOE mixed radioactive wastes for which chromium reduction followed by chemical precipitation is the required treatment. Analysis of the DOE data identified 1,650 gallons of D007 wastewaters as the only DOE mixed radioactive wastes requiring this treatment. This waste was generated at only one facility. The analysis, however, identified no chromium reduction or chemical precipitation treatment capacity. Thus, there is a DOE capacity shortfall for chromium reduction followed by chemical precipitation.

B.4.14 Alkaline Chlorination Followed by Chemical Precipitation

Table B-2(m) provides data on DOE mixed radioactive wastes for which alkaline chlorination followed by chemical precipitation is the required treatment. The following DOE wastes require this treatment: F006 wastewaters and F007, F008, and F009 nonwastewaters and wastewaters. Approximately 500,000 gallons of mixed radioactive wastes require this treatment. This volume accounts for approximately 0.3 percent of the non-soil and debris DOE mixed radioactive wastes affected by this rule.

No alkaline chlorination or chemical precipitation treatment capacity is available at DOE facilities. Consequently, there is a capacity shortfall for this technology.

B.4.15 Alkaline Chlorination Followed by Stabilization of Metals

Alkaline chlorination followed by stabilization of metals is BDAT for mixed radioactive wastes containing F006 nonwastewaters. Table B-2(n) provides information on these wastes, and shows that 8 million gallons are generated at DOE facilities. This quantity accounts for 5 percent of all non-soil and debris DOE mixed radioactive wastes affected by this propose rule. No capacity for this treatment was identified, so there is currently a DOE capacity shortfall for alkaline chlorination followed by stabilization of metals.

B.4.16 Soil and Debris

Through analysis of DOE data, EPA has determined that there are 193 million gallons of soil and debris contaminated with mixed radioactive waste at DOE facilities. This volume accounts for 53 percent of all DOE mixed radioactive wastes that may be affected by this rule. Table B-2(o) provides information on these soil and debris wastes.

Over 98 percent of the soil and debris volume contains "unknown" or "various" RCRA hazardous wastes. The types of RCRA hazardous wastes listed for the less than two percent that were characterized included D006, D008, D009, and D011. One facility listed almost three million gallons of soil and debris contaminated with D008.

EPA has added a subcategory to debris called "inorganic solid debris." Mixed radioactive waste in this form have been included in the capacity analysis for soil and debris.

There is no DOE treatment capacity for soil and debris contaminated with mixed radioactive wastes.

B.4.17 Other DOE Wastes

Several wastes identified within the DOE data could not be placed in a particular treatability group. These "other" wastes amounted to 3.3 million gallons, or one percent of all DOE mixed radioactive wastes affected by this rule. Approximately 87,000 gallons of these miscellaneous wastes listed "various" or "unknown" waste codes, and could not be classified in any particular treatability group. Two wastes, amounting to 3,210,030 gallons, were classified as containing "D's," "P's," and "U's." Approximately 2.3 million gallons of this total was identified as high-level fuel process wastes. The other one million gallons were designated as calcinated wastes. Because of the incomplete classification of these wastes and their unique physical form, these mixed radioactive wastes were not assigned to a particular treatability group. Excluding these wastes from the analysis does not affect the need for a variance, as these volumes would only add to the capacity shortfalls that have already been identified.

B.4.18 DOE Planned Treatment Capacity

Although there are currently DOE capacity shortfalls for all treatability groups, a considerable number of treatment units are either planned or under construction at DOE facilities. When operational, these units will provide significant treatment capacity for a number of treatability groups. Because these units will not be available in May 1990, however, they were not considered in the Third Third capacity analysis.

At least 20 different treatment units are expected to come on line at DOE facilities between 1992 and 2012. These units will include several incinerators (including controlled air, rotary kiln, and plasma arc), solidification units, vitrification and glass/ceramic process units, grout operations (some with pre-processing such as sorting and shredding), and other treatment units such as evaporators and leaching systems. These treatment units will provide significant treatment capacity for mixed radioactive wastes generated at DOE facilities in the future.

B.5 Analysis of Non-DOE Mixed Radioactive Waste Generation

Several types of non-DOE facilities generate mixed radioactive wastes. In this analysis, EPA used the best available information on the quantities and characteristics of mixed radioactive wastes generated at non-DOE facilities. Information used for this capacity analysis include data developed as part of EPA's Generator Survey, state and interstate compact surveys and reports, a study developed for the Office of Technology Assessment of the U.S. Congress, a study developed for the Nuclear Management Resources Council, and a series of reports developed by Brookhaven National Laboratory for the Nuclear Regulatory Commission. These data sources vary in detail and none of them provide national estimates of non-DOE mixed radioactive waste generation.

To derive non-DOE mixed radioactive waste generation information that could be compared or combined with DOE data to determine the total demand for alternative capacity, EPA had to develop:

(1) Rough estimates of the quantities of non-DOE mixed radioactive wastes generated; and
(2) The types of RCRA hazardous waste codes found in these wastes.

Ideally, the non-DOE mixed radioactive waste generation rates would be linked to specific RCRA waste codes. With this level of detail, EPA could allocate non-DOE mixed radioactive wastes to treatability groups and combine this information with similar data for DOE facilities. In analyzing the available information, however, EPA found that, in most cases, the information characterizing non-DOE mixed radioactive wastes was not sufficiently detailed to perform such an analysis. As described below, several data sources list "mixed waste" as a single category, while others provide a single, overall generation rate while listing several potential hazardous contaminants. Thus, in many cases, EPA could not directly calculate generation rates by RCRA waste code.

The following discussion outlines the most relevant information. Attachment B-1 provides complete citations for these data sources. The volume analysis and characterization of these wastes were performed simultaneously, as these pieces of information were usually presented together.

EPA's Survey of Hazardous Waste Generators provided limited data on the quantities of mixed radioactive wastes generated in 1986. It did not, however, provide generation information by RCRA waste code. The available Generator Survey information identifies 47 facilities that reported generating mixed radioactive wastes. Nine of these were DOE facilities, which were not considered in the non-DOE analysis. The remaining 38 facilities were universities, medical institutions, industrial facilities, and waste processors. These non-DOE facilities reported generating a total of 307,626 gallons of mixed radioactive waste. An unknown portion of these wastes are subject to this Third Third rule.

The 1987 Annual Survey Report developed by the State of Illinois Department of Nuclear Safety included information on two categories of mixed radioactive wastes:

(1) Liquid scintillation fluids. The report indicates that Illinois generators shipped 1,444 cubic feet (10,776 gallons) of liquid scintillation fluids. How these shipped wastes were managed is discussed in Section B.6.

(2) "Hazardous chemicals." The report indicated that a total of 1,762 cubic feet (about 13,149 gallons) of hazardous chemicals is being stored by Illinois generators due to technical or regulatory concerns. The report states that "hazardous chemicals" may be mixed radioactive wastes. No characterization data were available beyond this classification. In addition, one generator indicated that 53,774 cubic feet (401,299) gallons) of radioactive waste contaminated with hazardous chemicals were being stored for future shipment or alternative treatment.

In addition to the 1987 Illinois report, EPA analyzed information from the 1988 Illinois LLW Generator Survey. This survey reported that 2,774.3 cubic feet (20,704 gallons) of mixed radioactive wastes were being stored due to technical or regulatory constraints on disposal. A total of 2,372.2 cubic feet (17,705 gallons) or about 85 percent of all mixed radioactive wastes in this section of the survey were contaminated with RCRA solvents, for which land disposal restrictions are already in place. Only 3,000 gallons of the total, therefore, are affected by this Third Third rule. Potential RCRA hazardous wastes found in these mixed radioactive wastes included scintillation fluids (potentially D001), acidic liquids (potentially D002), and lead (potentially D008).

The Northwest Interstate Compact on Low-Level Radioactive Waste Management performed surveys in 1988 and 1989 to obtain information on mixed radioactive wastes. The 1988 survey indicated an annual mixed radioactive waste generation rate of 16,173.5 cubic feet (120,698 gallons) for states in the Compact. Of this total, 15,000 cubic feet (111,940 gallons) were reported as one-time generation by a single generator. The 1989 survey indicated an annual generation rate of 184 cubic feet (1,373 gallons). Discounting the 15,000 cubic feet generated at the one facility in 1988, the total amount generated fell by over 80 percent between the 1988 and 1989 surveys.

The Northwest Compact report identified the following potential First Third, Second Third, and Third Third mixed radioactive wastes:

- Chromium waste (potentially D006);
- Lead mixtures (potentially D008);
- Organic corrosives (potentially D002);
- Scintillation fluids (potentially D001); and
- Exchange resins (potentially contain EP toxicity metals).

An informal LLW report by the Massachusetts Association of Radioactive Waste Generators (cited in Jennrich, March 1989) reports that Massachusetts annually generates 2932 cubic feet (21,881 gallons) of scintillation materials, which are potentially affected by this Third Third rule.

The 1988 Connecticut Low-Level Waste Management Plan also contains some information on mixed radioactive wastes. The 1987 Survey reported the in-state generation of 1906.4 cubic feet (14,277 gallons) of liquid scintillation wastes and approximately 20 gallons of lead-contaminated mixed radioactive wastes.

The 1986 Generator Survey conducted by the Northeast Interstate Low Level Radioactive Waste Commission indicated that mixed radioactive wastes constitute four percent of the regional waste stream. The report stated that 4,757 cubic feet (35,500 gallons) were shipped from the region for disposal.

New York and the Midwest Compact surveys addressed mixed radioactive waste generation that would occur during or after 1993. New York generators indicated that 4,535 cubic feet (32,488 gallons) of mixed radioactive waste would be generated in 1993. The Midwest Compact states indicated that 8,372 cubic feet (62,477 gallons) would be generated between January 1993 and December 1995, which is slightly more than 20,000 gallons per year.

The above discussion outlines the best available data from the state and interstate compact surveys and reports. Additional surveys were analyzed (see Attachment B-1), but the information included in those documents was of limited use in this capacity analysis.

In addition to the survey data discussed above, EPA also evaluated information provided in two summary reports, one performed for the Office of Technical Assessment of the U.S. Congress (Jennrich, March, 1989, referred to as the OTA report) and the other for the Nuclear Management and Resource Council (Jennrich, June 1989, referred to as the NUMARC report) The reports were useful in identifying the types of wastes generated at non-DOE facilities. Both reports, however, indicated that the data included do not represent national estimates of national mixed radioactive waste generation.

The OTA report, which included information from the NUMARC report, develop seven groups of mixed radioactive wastes based on the hazardous constituents involved:

- Liquid scintillation cocktails or fluids;
- Organic chemicals/trash;
- Lead and lead decontamination solutions;
- Waste oil/oily trash;
- CFC/CFC concentrates;
- Aqueous corrosive liquids; and
- Chromate/cadmium wastes.

Of these seven, only four are potentially affected by this rule: liquid scintillation fluids are potentially D001 wastes; lead and lead decontamination solutions are potentially D008; aqueous corrosive liquids are potentially D002; and chromates and cadmium are potentially D007 and D006, respectively. The other three categories are either not currently RCRA hazardous wastes (waste oil) or are wastes for which the LDRs currently are already in effect (solvents).

In addition to the four categories listed above, investigation of the NUMARC report also identified reactive chemicals as potential D003 mixed radioactive wastes. Information on the quantities of these wastes generated, however, were not available.

In an effort to roughly estimate the non-DOE mixed radioactive waste generated annually, EPA used an analysis of mixed radioactive wastes performed by Brookhaven National Laboratory for the Nuclear Regulatory Commission which indicated that approximately three percent of all low-level radioactive wastes are potentially contaminated with RCRA hazardous wastes. Applying this percentage to the approximately 13.4 million gallons of LLW generated in 1986 (Jennrich, March 1989), roughly 400,000 gallons of mixed radioactive wastes were generated in that year.

Although this figure provides an approximation of the amount of non-DOE mixed radioactive wastes generated annually, several other factors had to be considered during the analysis of non-DOE mixed radioactive waste generation in support of this rule. First, this figure accounts for all mixed radioactive wastes, including solvents, dioxins, and California list wastes, for which land disposal restrictions are already in place. EPA has determined that the mixed radioactive wastes already subject to the LDRs constitute a significant portion of all non-DOE mixed radioactive wastes.

A second factor that is not reflected in the approximation is the quantity of mixed radioactive wastes in storage at non-DOE facilities. If untreated, these wastes constitute a demand for treatment capacity. EPA's review of available information sources indicates that there are significant quantities of mixed radioactive wastes in storage at non-DOE facilities.

As a result of the analysis of available information on the generation of non-DOE mixed radioactive wastes, EPA has reached several conclusions:

(1) There is a lack of quantifiable information on the generation and management of mixed radioactive wastes at non-DOE facilities. EPA has based this analysis on what it considers to be the best information available. EPA recognizes, however, that these information sources are both limited in content and limited to only a sample of the total non-DOE mixed radioactive waste universe. In the proposed rule, the Agency solicited any additional information on the generation and management of non-DOE mixed radioactive wastes. No additional data were submitted, but several commenters supported the proposed national capacity variance for mixed radioactive wastes and confirmed that a lack of commercial treatment and disposal capacity currently exists.

(2) The volumes of mixed radioactive wastes generated at non-DOE facilities are relatively small compared to those generated at DOE facilities. The rough estimate of 400,000 gallons of mixed radioactive wastes generated annually (based on the Brookhaven estimate that three percent of all LLW is also mixed radioactive waste) is known to include mixed radioactive wastes that are not affected by this rule. EPA has determined, however, that significant quantities of mixed radioactive wastes are in storage at non-DOE facilities requiring treatment. Even if the actual quantity of mixed radioactive wastes was five times the 400,000 gallon estimate, this quantity would still be less than one percent of the DOE-generated mixed radioactive wastes that are affected by this rule. Non-DOE mixed radioactive wastes, therefore, are expected to have no significant impact on the capacity analysis performed on mixed radioactive wastes at DOE facilities.

(3) The types of mixed radioactive wastes generated at non-DOE facilities are also generated at DOE facilities. Upon analysis of available non-DOE information, no additional

RCRA waste codes were identified that were not already identified in the DOE data. Non-DOE mixed radioactive waste types, therefore, are not expected to affect the capacity analysis performed on the DOE data (i.e., no additional treatability groups for mixed radioactive wastes had to be established).

B.6 Analysis of Non-DOE Treatment Capacity

EPA has taken several steps to identify available non-DOE treatment capacity for mixed radioactive wastes. In support of the capacity analysis for the First Third Rule, EPA analyzed information from the 1986 Survey of Hazardous Waste Treatment, Storage, Disposal and Recovery Facilities (TSDR Survey). EPA's review of process-specific TSDR Survey questionnaire responses identified no existing or planned commercial treatment, recovery, or disposal systems for mixed radioactive wastes. To supplement information in the TSDR Survey, EPA investigated several other sources of information, which were discussed in section B.5. As described below, the various sources generally indicated that a shortfall of available treatment capacity for mixed radioactive wastes exists around the nation.

B.6.1 Identification of non-DOE Treatment Capacity

In order to identify available non-DOE treatment capacity, EPA investigated available non-DOE information to determine how the different types of mixed radioactive wastes are currently managed.

One of the primary types of mixed radioactive wastes affected by the Third Third rule is scintillation waste. Scintillation fluids usually meet the RCRA ignitability characteristic (D001) and are therefore Third Thirds wastes. Combustion is the BDAT technology for D001 wastes. Investigation of the TSDR Survey identified no RCRA-permitted combustion facilities that accept mixed radioactive wastes. Because many scintillation fluids contain radionuclides with relatively short half-lives, EPA believes that a large amount of these materials are stored for decay and then managed as non-radioactive hazardous wastes. This conclusion is based on information in the

OTA report, and is supported by several of the state and interstate reports. Although the scintillation fluids, such as toluene and xylene, may eventually be incinerated as non-radioactive wastes, no combustion facilities handling mixed radioactive wastes have been identified.

Analysis of the state and interstate reports and other data sources identified no available treatment capacity for any other RCRA mixed radioactive wastes subject to the Third Third rule. The data sources contained evidence of capacity shortfalls, as discussed below.

The 1987 Illinois LLW Annual Survey Report indicated that every LLW generator possessing "hazardous chemicals" reported storing these wastes. Although data characterizing these wastes were not available, EPA assumed that "hazardous chemicals" may contain First Third, Second Third, or Third Third RCRA wastes. Generators reported storing at least 400,000 gallons of potential mixed radioactive wastes because of regulatory or technical constraints or for future shipment or alternative management. None of these wastes are currently being treated.

The 1989 Northwest Compact Region Survey, the 1988 Connecticut Low-Level Radioactive Waste Management Plan, the Northeast Interstate Low-Level Radioactive Waste Commission's Regional Waste Management Plan (August 1989), and the Pennsylvania/Appalachian States Compact Low-Level Waste Management Survey (1987) also indicate a lack of available treatment capacity for mixed radioactive wastes. The Northeast Interstate Low-Level Radioactive Waste Commission's Regional Waste Management Plan, for example, indicated that mixed radioactive waste generators are concerned about the storage limitations imposed by the land disposal restrictions because there are no disposal or treatment facilities within the Compact region.

The OTA report, which incorporates data from the state and interstate surveys, the NUMARC report, and an informal survey of generators, processors, and brokers, also did not identify significant treatment capacity for First Third, Second Third, or Third Third wastes.

- The OTA report noted that the majority of contaminated solid and elemental lead (potentially D008) is currently stored. The report did indicate that some lead decontamination solutions are currently being solidified, which could represent BDAT if determined not to be EP Toxic for lead. EPA, however, has not identified any non-DOE stabilization capacity. The Agency welcomes any information on stabilization capacity for D008 wastes.

- The OTA report also stated that aqueous corrosive liquids, which are potentially D002 mixed radioactive wastes, are currently being stored in lieu of any ongoing treatment. EPA has not identified any non-DOE neutralization capacity for D002 wastes.

- Chromate and cadmium wastes are the only remaining potential Third Third mixed radioactive wastes identified in the OTA report. No available treatment capacity for chromate- or cadmium-containing mixed radioactive wastes was identified in the reports. (These wastes are potentially D006 and D007 mixed radioactive wastes. According to the NUMARC report, nuclear power plants are potential generators of these wastes. These wastes, however, were not reported as mixed radioactive wastes in any of the other information sources.)

In an effort to identify additional data sources that might contain information on mixed radioactive waste treatment capacity, EPA contacted mixed radioactive waste experts associated with federal, state, and interstate organizations. Attachment B-3 to this appendix describes these phone contacts. These individuals were asked to identify any relevant data sources on the generation of and treatment or recovery capacity for mixed radioactive wastes. All information sources that were obtained as a result of these conversations are listed in Attachment B-1 and were incorporated into this analysis. A majority of the individuals contacted indicated that they knew of no available commercial treatment or recovery capacity for mixed radioactive wastes. Other respondents, however, identified four existing and one planned facility that they thought may be treating mixed radioactive wastes. Upon reinvestigation of the TSDR data set, EPA concluded that none of these facilities have BDAT treatment capacity that affect the capacity analysis for the Third Third rule.

B.6.2 Summary of Non-DOE Treatment Capacity

EPA believes that the information developed for this capacity analysis constitutes the best available data on the generation and treatment of mixed radioactive wastes at non-DOE facilities. EPA recognized that the information on non-DOE facilities was limited and the proposed rule solicited comments by interested parties on the generation and management of non-DOE mixed radioactive wastes. Commenters addressing non-DOE mixed radioactive wastes supported the national capacity variance for these wastes.

EPA has not identified any non-DOE treatment capacity for non-DOE mixed radioactive wastes affected by this rule:

- Combustion is the BDAT for D001 wastes which may be found in scintillation fluids. No non-DOE combustion capacity was identified in this capacity analysis.

- Stabilization is the BDAT for D006 (cadmium), D007 (chromium), and most D008 (lead) nonwastewaters. No non-DOE stabilization capacity was identified in this capacity analysis.

- Macroencapsulation is the BDAT for solid (i.e., elemental) lead (D008). This BDAT is unique to solid lead mixed radioactive wastes, which are often in the form of shielding, lead "pigs," or bricks. These waste are known to be generated at non-DOE facilities. No surface contamination/ encapsulation treatment capacity, however, was identified in this analysis.

- Chemical Precipitation is the BDAT for D006 and D008 wastewaters. No non-DOE chemical precipitation capacity was identified.

- Chromium Reduction followed by Chemical Precipitation is the BDAT for D007 (chromium) wastewaters. No non-DOE chromium reduction followed by chemical precipitation treatment capacity was identified in this analysis.

- Neutralization is the BDAT for D006 and D008 wastewaters. No non-DOE neutralization treatment capacity was identified in this capacity analysis.

In addition to the treatability groups discussed above, EPA has identified two other treatment technologies that are unique to mixed radioactive wastes -- amalgamation (for elemental mercury) and incineration as amethod of treatment (for hydraulic oils containing mercury) -- which were discussed in sections B.4.4 and B.4.10. No non-DOE treatment capacity for these technologies was identified.

Although no additional First Third, Second Third, or Third Third waste codes have been identified specifically, a large amount of uncharacterized mixed radioactive wastes are generated at non-DOE facilities. (See Section B.5.) These uncharacterized mixed radioactive wastes may contain RCRA waste codes not identified above. Because no RCRA treatment capacity is available for mixed radioactive wastes, any generation of First Third, Second Third, or Third Third wastes not identified here would face a capacity shortfall.

B.7 National Capacity Variance for Mixed Radioactive Wastes

Based on the analysis discussed above, EPA has determined that there is currently insufficient BDAT or equivalent treatment capacity for mixed radioactive wastes at both DOE and non-DOE facilities. Because a treatment capacity shortfall was identified for every mixed radioactive waste treatability group, EPA is proposing to grant a national capacity variance for all mixed radioactive wastes. The waste codes that have been identified in this analysis are arranged in treatability groups according to BDAT or the equivalent in Table B.1, which also summarizes the treatment capacity shortfalls.

Table B.1
Summary of National Capacity Variance for Mixed Radioactive Waste
(millions of gallons/year)

BDAT or EQUIVALENT	RCRA WASTE CODE(S)	QUANTITY REQUIRING TREATMENT	MAXIMUM TREATMENT
Stabilization	D005 nonwastewaters D006 nonwastewaters D007 nonwastewaters D008 nonwastewaters D011 nonwastewaters	63.6	2.8
Surface Deactivation Followed by Encapsulation	D008 (solid)	<0.2	0
Combustion	D001 P068 D012 U002 D013 U019 D014 U022 D015 U213 D016 U220 D017 U226 U239	1.6	0*
Incineration Followed by Ash Stabilization	D009 (hydraulic oils)	<0.1	0
Neutralization	D002	26.2	0.2
Vitrification	D004 nonwastewaters D010 nonwastewaters High-level mixed wastes	14	0
Alkaline Chlorination	D003	0.8	0
Treatment of Reactives	D003	<0.1	0
Chemical Precipitation	D004 wastewaters D005 wastewaters D006 wastewaters D008 wastewaters D010 wastewaters D011 wastewaters	<0.1	0
Sulfide Precipitation	D009	51.6	0
Amalgamation with Zinc	D009 (elemental)	<0.1	0
Metals Recovery	F015	0.2	0
Chromium Reduction Followed by Chemical Precipitation	D007 wastewaters	<0.1	0
Alkaline Chlorination Followed by Chemical Precipitation	F007 F008 F009 F006 wastewaters	0.5	0
Alkaline Chlorination Followed by Stabilization of Metals	F006 nonwastewaters	8.1	0
Soil and Debris	various	193	0
Other	various/unknown	3.3	0

* Combustion capacity expressed in terms of "available" capacity.

No information was available for mixed radioactive wastes that are disposed of in deep wells. For this reason, EPA is not proposing to grant a national capacity variance for these wastes.

ATTACHMENT B-1

SOURCES OF INFORMATION ON NON-DOE MIXED RADIOACTIVE WASTES

This attachment describes the sources of information on non-DOE wastes gathered and analyzed by EPA as part of the capacity analysis. The attachment is organized in the following sections: EPA national surveys, overview reports, state and interstate compact surveys and reports, and telephone contacts.

NATIONAL SURVEYS

In an effort to develop information on the universe of hazardous waste management in the United States, EPA developed two comprehensive national surveys.

TSDR Survey

The General Facility Information questionnaire requested information on types and commercial status of mixed radioactive waste management, volumes treated in 1986, the maximum quantity of mixed radioactive wastes that could have been treated in 1986, and when treatment would discontinue at each facility. No specific waste code or waste stream information was requested, but some waste codes were determined through the use of facility notes and facility contacts. The TSDR survey was used to identify any operating facilities that treat or recover mixed radioactive wastes, and to investigate operations at facilities that could potentially handle mixed radioactive wastes.

Generator Survey

The Generator Survey Questionnaires contain very general references to mixed radioactive wastes. Specifically, Questionnaire GA (General Facility Information) asks three basic questions: (1) Did the facility generate mixed radioactive wastes on-site; (2) What quantity was generated; and (3) How are these mixed radioactive wastes managed. Although the Generator Survey data set is currently incomplete, only 47 facilities have been identified as indicating that they generate mixed radioactive wastes. Several of these were DOE facilities and several were research universities. Although these facilities reported mixed radioactive waste generation quantities. EPA is of the opinion that these facilities represent only a small sample of the mixed radioactive waste-generating community. This conclusion is based on information contained in the overview reports listed below, which indicate that hundreds of facilities are potential generators of mixed radioactive wastes. For example, over 100 nuclear power plants are potential generators of mixed radioactive wastes. Use of information in the Generator Survey is discussed within the text of this appendix.

OVERVIEW REPORTS

In response to increased concern over the responsible management of mixed radioactive wastes, several national trade associations and government agencies undertook studies to examine the generation and management of mixed radioactive wastes. These studies are outlined below.

- Jennrich, E.A., Rogers and Associates Engineering Corporation, Management Practices and Disposal Concepts for Low-Level Radioactive Mixed Waste, Congress of the United States, Office of Technology Assessment, Washington, D.C., March 1989.

  This report is perhaps the most comprehensive analysis of low-level mixed radioactive wastes completed to date. It identifies generators, processes, and RCRA hazardous wastes. The report, however, provides no national estimates of mixed radioactive waste generation. The data were developed through reviewing existing information, contacting national associations, and where necessary, surveying a sample of LLW generators, processors, and brokers. The purpose of the study was to identify current management practices and to develop a common understanding of mixed radioactive waste management system performance goals and disposal system design features. The information in this document was useful for identifying processes and management practices at non-DOE facilities. Generation rate information was also useful for determining the relative magnitudes of different types of mixed radioactive wastes generated at the various types of facilities.

- Jennrich, E.A., Rogers and Associates Engineering Corporation, The Management of Mixed Waste in the Nuclear Power Industry, prepared for Nuclear Management and Resources Council (NUMARC), Washington, D.C., June, 1989.

  This analysis provided conservative (i.e., upper bound) estimates of mixed radioactive waste generation at nuclear power plants. The document carefully notes that its estimates of mixed radioactive waste generation at a typical nuclear power plant should not be seen as definitive. The value of the information presented in this report is not so much in the magnitude of mixed waste volumes as it is in identifying processes that potentially produce mixed wastes.

- Brookhaven National Laboratory, Analysis of Low-Level Wastes: Review of Hazardous Waste Regulations and Identification of Radioactive Mixed Wastes. Final Report; study prepared for the Nuclear Regulatory Commission, Washington, D.C., December 1985.

This report examines the identification and management of low-level radioactive mixed wastes. Brookhaven developed the data by reviewing existing data and surveying several of the largest LLW generators. Wastes of potential concern that were analyzed include: Liquid scintillation wastes, spent organic solvents, lead metal, and chromate-containing wastes.

Weaknesses in the Brookhaven information for purposes of the Third Third capacity analysis include a lack of detailed waste characterization and problems associated with using a representative sample -- no national estimates of specific mixed radioactive waste quantities were developed.

In terms of the capacity analysis, the information in these documents was useful primarily in targeting processes and waste codes of concern to be analyzed in more detail.

- EPA, Mixed Energy Waste Study (MEWS), Office of Solid Waste, Washington, D.C., 20640, March 1987.

This report summarizes the findings of EPA's MEWS Task Force which investigated DOE's management of HLW and TRU wastes in order to compare the practices to requirements for hazardous waste management under RCRA Subtitle C. This report was used to identify some of the types of mixed radioactive wastes that are generated at DOE facilities prior to investigation of the data provided by DOE.

STATE AND INTERSTATE COMPACT SURVEYS AND REPORTS

The following state and interstate compact surveys and reports were evaluated during this capacity analysis:

Carlin, Elaine, *Mixed Waste in Washington and the Northwest Compact Region: Problem Definition, Timelines, and Management Options*, Low-Level Radioactive Waste Program, Department of Ecology, State of Washington, 1989.

Carlin, Elaine, *Mixed Waste Management in Washington and the Northwest Compact Region*, Low-Level Radioactive Waste Program, Department of Ecology, State of Washington, 1988.

Connecticut Hazardous Waste Management Service, *1988 Connecticut Low-Level Radioactive Waste Management Plan*, December 1988.

Illinois Department of Nuclear Safety, *1987 Annual Survey Report*, May 1989.

Illinois Department of Nuclear Safety, *1988 LLW Generator Survey*, (data set on facilities storing mixed radioactive wastes due to regulatory or technical constraints on disposal)

New York State Energy Research and Development Authority, *1988 New York State Low-Level Radioactive Waste Status Report*, June 1989.

Northeast Interstate Low-Level Radioactive Waste Commission, *Regional Management Plan Update*, August 1989.

Northwest Interstate Compact on Low-Level Radioactive Waste Management, *Options for Mixed Waste Management, Discussion Paper*, April 1989 (revised).

Pennsylvania Department of Environmental Management, *Appalachian States Compact Low-Level Radioactive Waste Management Survey - 1987*, 1988.

Pennsylvania Department of Environmental Management, *Pennsylvania and Maryland Low-Level Radioactive Waste Management Survey - 1986*, October 1987.

Southeast Compact Commission, *1987 Summary of Low-Level Radioactive Waste Management in the Southeast Compact*, 1988.

TELEPHONE CONTACTS

In an effort to identify more information sources, data, or reports, several state, regional, and federal officials were contacted by telephone. These groups included the following:

Afton & Associates (Management Consultants of Working Group for Central Compact Commission). Contact: Edgar Miller.

Central Compact Commission, Lincoln, NE. Contact: Jay Ringenberg

Commonwealth of Pennsylvania, Department of Environmental Resources, Bureau of Radiation Protection, Division of Nuclear Safety, 200 N. Third Street, Fulton Bldg., 16th Fl., P.O. Box 2063, Harrisburg, PA 17120. Contact: Kenneth Singh.

Congress of the United States, Office of Technology Assessment, Washington, D.C. Contact: Gretchen McCabe.

Connecticut Hazardous Waste Management Service, Suite 360, 900 Asylum Ave., Hartford, CT 06105-1904. Contact: Meg Harvey.

Envirosphere (consultant for Southwest Compact), WA. Contacts: Tim Gould and Nancy Kerner.

Illinois Department of Nuclear Safety, 1035 Outer Park Dr., Springfield, IL 62704. Contact: Melissa Young.

Midwest Low-Level Radioactive Waste Commission, 350 No. Robert St., Room 588, St. Paul, MN 55101. Contact: Susan Olsson, Assistant to the Director.

Nevada State Division of Health, Carson City, NV. Contact: John Vaden.

New York State Energy Research and Development Authority, Communications Dept., Two Rockefeller Plaza, Albany, NY 12223. Contact: Ann Constantino.

Nuclear Regulatory Commission--Washington State, Olympia, WA. Contacts: Toby Michelina and Stephanie Ko, Low-Level Waste Management Group.

Principaled Negotiations Inc., Amherst, NH. Contact: Arnie Wight.

Rocky Mountain Compact Commission, Denver, CO. Contact: Karen Salzer.

Rogers and Associates Engineering Corp., UT. Contact: Ed Jennrich.

South Carolina Dept. of Health and Environmental Control, Office of Radiological Health, Waste Division. Contact: Vergil Autry.

Southeast Compact Commission for Low-Level Radioactive Waste Management, 3901 Barrett Dr., Suite 100, Raleigh, NC 27609. Contact: Kathryn Visocki.

Southwest Compact Commission, Sacramento, CA. Contacts: Reuben Junkert, Dept. of Health Services and Russ Huck.

State of Washington, Department of Ecology, Mail Stop PV-11, Olympia, WA. Contacts: Sarah Hana, Radiation Health Physicist, LLRW Management Program and Earl Liverman and Roger Stanley.

State of Washington Department of Health. Contacts: Gary Robeson and Mike Elsen.

ATTACHMENT B-2

TECHNOLOGY-BASED SUMMARIES OF DOE MIXED RADIOACTIVE WASTE GENERATION AND TREATMENT CAPACITY

TABLE B-2(a)

DOE NET TREATMENT CAPACITY AT THE END OF 1989
(Quantities expressed in gallons)

***** BDAT/TREATMENT TECHNOLOGY - STABILIZATION *****

Affected waste codes:
D005 nonwastewaters
D006 nonwastewaters
D007 nonwastewaters
D008 nonwastewaters
D011 nonwastewaters
F006 nonwastewaters

FACILITY	MAXIMUM ON-SITE TREATMENT CAPACITY	QUANTITY REQUIRING TREATMENT
AMES LAB	0	0
ARGONNE NATIONAL LAB - E	0	275
ARGONNE NATIONAL LAB - W	0	153
BROOKHAVEN NATIONAL LAB	0	0
FMPC	0	37,648
HANFORD	0	35,953,758
IDAHO NATIONAL ENGINEERING LAB	680,050	5,277,851
ITRI	0	705
KANSAS CITY	0	55
LIVERMORE - SNL	0	67
LOS ALAMOS NATIONAL LAB	0	193,967
MOUND	0	978
NEVADA TEST SITE	0	79
OAK RIDGE NATIONAL LAB	1,518,093	1,694,546
PANTEX	0	6,782
PINELLAS	0	2,114
ROCKY FLATS	121,737	125,186
SANDIA NATIONAL LAB	0	22,215
SAN - LLNL	0	656
SAVANNAH RIVER	0	20,333,123
WEST VALLEY	444,120	0
TOTALS:	2,764,000	63,650,158
*** NET STABILIZATION CAPACITY:	(60,886,158)	

* SAN/LLNL and Savannah River have stabilization treatment units, but they have not been determined to be RCRA BDATs

TABLE B-2(b)

DOE NET TREATMENT CAPACITY AT THE END OF 1989
(Quantities expressed in gallons)

***** BDAT/TREATMENT TECHNOLOGY = MACROENCAPSULATION *****

Affected waste codes: D008 solid

FACILITY	MAXIMUM ON-SITE TREATMENT CAPACITY	QUANTITY REQUIRING TREATMENT
AMES LAB	0	0
ARGONNE NATIONAL LAB - E	0	0
ARGONNE NATIONAL LAB - W	0	214
BROOKHAVEN NATIONAL LAB	0	0
FMPC	0	0
HANFORD	0	74,504
IDAHO NATIONAL ENGINEERING LAB	0	21,136
ITRI	0	54
KANSAS CITY	0	120
LIVERMORE - SNL	0	0
LOS ALAMOS NATIONAL LAB	0	0
MOUND	0	0
NEVADA TEST SITE	0	0
OAK RIDGE NATIONAL LAB	0	0
PANTEX	0	3,140
PINELLAS	0	0
ROCKY FLATS	0	7,537
SANDIA NATIONAL LAB	0	0
SAN - LLNL	0	117
SAVANNAH RIVER	0	48,600
WEST VALLEY	0	0
TOTALS:	0	155,422

*** NET STABILIZATION CAPACITY: (155,422)

TABLE B-2(c)

DOE NET TREATMENT CAPACITY AT THE END OF 1989
(Quantities expressed in gallons)

***** BDAT TREATMENT TECHNOLOGY = COMBUSTION *****

Affected waste codes:
D001
P068
U002
U019
U022
U213
U220
U226
U239
D012
D013
D014
D015
D016
D017

FACILITY	AVAILABLE ON-SITE TREATMENT CAPACITY	QUANTITY REQUIRING TREATMENT
AMES LAB	0	0
ARGONNE NATIONAL LAB - E	0	9,200
ARGONNE NATIONAL LAB - W	0	0
BROOKHAVEN NATIONAL LAB	0	300
FMPC	0	0
HANFORD	0	9,872
IDAHO NATIONAL ENGINEERING LAB	0	1,557,448
ITRI	0	6,517
KANSAS CITY	0	0
LIVERMORE - SNL	0	317
LOS ALAMOS NATIONAL LAB	0	4,529
MOUND	0	10,964
NEVADA TEST SITE	0	0
OAK RIDGE NATIONAL LAB	0	17,701
PANTEX	0	3,764
PINELLAS	0	0
ROCKY FLATS	0	0
SANDIA NATIONAL LAB	0	4,522
SAN - LLNL	0	11,018
SAVANNAH RIVER	0	935
TOTALS:	0	1,637,087

*** NET COMBUSTION CAPACITY: (1,637,087)

- In this table, on-site treatment capacity is expressed in terms of "available" capacity rather than "maximum" capacity.

- Four DOE facilities have operating combustion units. The incinerator at INEL (WERF) is primarily a LLW (non-hazardous waste) incinerator but does burn some mixed waste. The Oak Ridge incinerator is believed to handle only on-site wastes. The available treatment capacity of these units has been assigned to mixed radioactive wastes other than those containing First Third, Second Third, or Third Third wastes (i.e., solvents and dioxins or California list wastes).

TABLE B-2(d)

DOE NET TREATMENT CAPACITY AT THE END OF 1989
(Quantities expressed in gallons)

***** BDAT/TREATMENT TECHNOLOGY = NEUTRALIZATION *****

Affected waste codes: D002

FACILITY	MAXIMUM ON-SITE TREATMENT CAPACITY	QUANTITY REQUIRING TREATMENT
AMES LAB	0	0
ARGONNE NATIONAL LAB - E	103,963	104,106
ARGONNE NATIONAL LAB - W	0	0
BROOKHAVEN NATIONAL LAB	70,013	314,583
FMPC	0	264
HANFORD	0	11,507,219
IDAHO NATIONAL ENGINEERING LAB	0	1,556,031
ITRI	0	2,492
KANSAS CITY	0	0
LIVERMORE - SNL	0	5
LOS ALAMOS NATIONAL LAB	0	0
MOUND	0	0
NEVADA TEST SITE	0	0
OAK RIDGE NATIONAL LAB	11,889	54,821
PANTEX	0	0
PINELLAS	0	0
ROCKY FLATS	0	0
SANDIA NATIONAL LAB	0	0
SAN - LLNL	20,819	2,556
SAVANNAH RIVER	0	12,629,663
TOTALS:	206,684	26,171,740

*** NET NEUTRALIZATION CAPACITY: (25,965,056)

* No neutralization treatment capacities were provided. In cases where DOE indicates current treatment is neutralization, the standard annual generation rate of the waste stream is used as the capacity of the treatment unit. Wastes in inventory are assumed to be untreated.

TABLE B-2(e)

DOE NET TREATMENT CAPACITY AT THE END OF 1989
(Quantities expressed in gallons)

***** BDAT/TREATMENT TECHNOLOGY = VITRIFICATION *****

Affected waste codes: D004 nonwastewaters
D010 nonwastewaters

FACILITY	MAXIMUM ON-SITE TREATMENT CAPACITY	QUANTITY REQUIRING TREATMENT
AMES LAB	0	0
ARGONNE NATIONAL LAB - E	0	0
ARGONNE NATIONAL LAB - W	0	0
BROOKHAVEN NATIONAL LAB	0	0
FMPC	0	0
HANFORD	0	8,988,439
IDAHO NATIONAL ENGINEERING LAB	0	0
ITRI	0	0
KANSAS CITY	0	0
LIVERMORE - SNL	0	0
LOS ALAMOS NATIONAL LAB	0	16,659
MOUND	0	0
NEVADA TEST SITE	0	0
OAK RIDGE NATIONAL LAB	0	0
PANTEX	0	0
PINELLAS	0	0
ROCKY FLATS	0	0
SANDIA NATIONAL LAB	0	2,925
SAN - LLNL	0	147
SAVANNAH RIVER	0	5,046,481
TOTALS:	0	14,062,554

** NET VITRIFICATION CAPACITY: (14,062,554)

TABLE B-2(f)

DOE NET TREATMENT CAPACITY AT THE END OF 1989
(Quantities expressed in gallons)

***** BDAT/TREATMENT TECHNOLOGY = ALKALINE CHLORINATION *****

Affected waste codes: D003

FACILITY	MAXIMUM ON-SITE TREATMENT CAPACITY	QUANTITY REQUIRING TREATMENT
AMES LAB	0	0
ARGONNE NATIONAL LAB - E	0	0
ARGONNE NATIONAL LAB - W	0	3,276
BROOKHAVEN NATIONAL LAB	0	0
FMPC	0	0
HANFORD	0	3,951
IDAHO NATIONAL ENGINEERING LAB	0	740,908
ITRI	0	0
KANSAS CITY	0	0
LIVERMORE - SNL	0	0
LOS ALAMOS NATIONAL LAB	0	0
MOUND	0	0
NEVADA TEST SITE	0	0
OAK RIDGE NATIONAL LAB	0	0
PANTEX	0	0
PINELLAS	0	0
ROCKY FLATS	0	0
SANDIA NATIONAL LAB	0	4,522
SAN - LLNL	0	358
SAVANNAH RIVER	0	34,580
TOTALS:	0	787,595

*** NET ALKALINE CHLORINATION CAP (787,595)

TABLE B-2(g)

DOE NET TREATMENT CAPACITY AT THE END OF 1989
(Quantities expressed in gallons)

***** BDAT/TREATMENT TECHNOLOGY - TREATMENT OF REACTIVES *****

Affected waste codes: D003

FACILITY	MAXIMUM ON-SITE TREATMENT CAPACITY	QUANTITY REQUIRING TREATMENT
AMES LAB	0	0
ARGONNE NATIONAL LAB - E	0	0
ARGONNE NATIONAL LAB - W	0	0
BROOKHAVEN NATIONAL LAB	0	0
FMPC	0	0
HANFORD	0	0
IDAHO NATIONAL ENGINEERING LAB	0	0
ITRI	0	0
KANSAS CITY	0	0
LIVERMORE - SNL	0	0
LOS ALAMOS NATIONAL LAB	0	0
MOUND	0	0
NEVADA TEST SITE	0	0
OAK RIDGE NATIONAL LAB	0	0
PANTEX	0	0
PINELLAS	0	0
ROCKY FLATS	0	0
SANDIA NATIONAL LAB	0	4,767
SAN - LLNL	0	0
SAVANNAH RIVER	0	0
TOTALS:	0	4,767

*** NET CAPACITY: (4,767)

TABLE B-2(h)

DOE NET TREATMENT CAPACITY AT THE END OF 1989
(Quantities expressed in gallons)

***** BDAT/TREATMENT TECHNOLOGY = CHEMICAL PRECIPITATION *****

Affected waste codes:	D004 wastewaters D005 wastewaters D006 wastewaters D008 wastewaters D010 wastewaters D011 wastewaters

FACILITY	MAXIMUM ON-SITE TREATMENT CAPACITY	QUANTITY REQUIRING TREATMENT
AMES LAB	0	0
ARGONNE NATIONAL LAB - E	0	0
ARGONNE NATIONAL LAB - W	0	0
BROOKHAVEN NATIONAL LAB	0	0
FMPC	0	0
HANFORD	0	0
IDAHO NATIONAL ENGINEERING LAB	0	0
ITRI	0	0
KANSAS CITY	0	0
LIVERMORE - SNL	0	0
LOS ALAMOS NATIONAL LAB	0	0
MOUND	0	0
NEVADA TEST SITE	0	0
OAK RIDGE NATIONAL LAB	0	0
PANTEX	0	0
PINELLAS	0	0
ROCKY FLATS	0	27
SANDIA NATIONAL LAB	0	0
SAN - LLNL	0	11,549
SAVANNAH RIVER	0	0
TOTALS:	0	11,576

*** NET CAPACITY: (11,576)

TABLE B-2(i)

DOE NET TREATMENT CAPACITY AT THE END OF 1989
(Quantities expressed in gallons)

***** BDAT/TREATMENT TECHNOLOGY = SULFIDE PRECIPITATION **

Affected waste codes: D009 wastewaters

FACILITY	MAXIMUM ON-SITE TREATMENT CAPACITY	QUANTITY REQUIRING TREATMENT
AMES LAB	0	0
ARGONNE NATIONAL LAB - E	0	0
ARGONNE NATIONAL LAB - W	0	0
BROOKHAVEN NATIONAL LAB	0	0
FMPC	0	0
HANFORD	0	0
IDAHO NATIONAL ENGINEERING LAB	0	0
ITRI	0	0
KANSAS CITY	0	0
LIVERMORE - SNL	0	0
LOS ALAMOS NATIONAL LAB	0	0
MOUND	0	0
NEVADA TEST SITE	0	0
OAK RIDGE NATIONAL LAB	0	0
PANTEX	0	0
PINELLAS	0	0
ROCKY FLATS	0	0
SANDIA NATIONAL LAB	0	0
SAN - LLNL	0	0
SAVANNAH RIVER	0	51,651,100
TOTALS:	0	51,651,100

*** NET SULFIDE PRECIPITATION CAPACITY: (51,651,100)

TABLE B-2(j)

DOE NET TREATMENT CAPACITY AT THE END OF 1989
(Quantities expressed in gallons)

***** BDAT/TREATMENT TECHNOLOGY = AMALGAMATION **

Affected waste codes: D009 (elemental)

FACILITY	MAXIMUM ON-SITE TREATMENT CAPACITY	QUANTITY REQUIRING TREATMENT
AMES LAB	0	0
ARGONNE NATIONAL LAB - E	0	0
ARGONNE NATIONAL LAB - W	0	3
BROOKHAVEN NATIONAL LAB	0	0
FMPC	0	793
HANFORD	0	0
IDAHO NATIONAL ENGINEERING LAB	0	0
ITRI	0	0
KANSAS CITY	0	0
LIVERMORE - SNL	0	0
LOS ALAMOS NATIONAL LAB	0	0
MOUND	0	0
NEVADA TEST SITE	0	0
OAK RIDGE NATIONAL LAB	0	0
PANTEX	0	0
PINELLAS	0	0
ROCKY FLATS	0	0
SANDIA NATIONAL LAB	0	0
SAN - LLNL	0	0
SAVANNAH RIVER	0	116
TOTALS:	0	912

*** NET AMALGAMATION WITH ZINC CAPACITY (912)

TABLE B-2(k)

DOE NET TREATMENT CAPACITY AT THE END OF 1989
(Quantities expressed in gallons)

***** BDAT/TREATMENT TECHNOLOGY = METALS RECOVERY *****

Affected waste codes: P015

FACILITY	MAXIMUM ON-SITE TREATMENT CAPACITY	QUANTITY REQUIRING TREATMENT
AMES LAB	0	0
ARGONNE NATIONAL LAB - E	0	0
ARGONNE NATIONAL LAB - W	0	0
BROOKHAVEN NATIONAL LAB	0	0
FMPC	0	246
HANFORD	0	0
IDAHO NATIONAL ENGINEERING LAB	0	143,791
ITRI	0	62
KANSAS CITY	0	0
LIVERMORE - SNL	0	0
LOS ALAMOS NATIONAL LAB	0	0
MOUND	0	0
NEVADA TEST SITE	0	0
OAK RIDGE NATIONAL LAB	0	0
PANTEX	0	18,499
PINELLAS	0	0
ROCKY FLATS	0	0
SANDIA NATIONAL LAB	0	0
SAN - LLNL	0	1,597
SAVANNAH RIVER	0	0
TOTALS:	0	164,195

*** NET METALS RECOVERY CAPACITY: (164,195)

TABLE B-2(1)

DOE NET TREATMENT CAPACITY AT THE END OF 1989
(Quantities expressed in gallons)

***** BDAT/TREATMENT TECHNOLOGY = CHROMIUM REDUCTION FOLLOWED BY CHEMICAL PRECIPITATION *****

Affected waste codes: D007 wastewaters

FACILITY	MAXIMUM ON-SITE TREATMENT CAPACITY	QUANTITY REQUIRING TREATMENT
AMES LAB	0	0
ARGONNE NATIONAL LAB - E	0	0
ARGONNE NATIONAL LAB - W	0	0
BROOKHAVEN NATIONAL LAB	0	0
FMPC	0	0
HANFORD	0	0
IDAHO NATIONAL ENGINEERING LAB	0	0
ITRI	0	0
KANSAS CITY	0	0
LIVERMORE - SNL	0	0
LOS ALAMOS NATIONAL LAB	0	0
MOUND	0	0
NEVADA TEST SITE	0	0
OAK RIDGE NATIONAL LAB	0	0
PANTEX	0	0
PINELLAS	0	0
ROCKY FLATS	0	0
SANDIA NATIONAL LAB	0	0
SAN - LLNL	0	1,650
SAVANNAH RIVER	0	0
TOTALS:	0	1,650
*** NET CAPACITY:	(1,650)	

TABLE B-2(m)

DOE NET TREATMENT CAPACITY AT THE END OF 1989
(Quantities expressed in gallons)

***** ALKALINE CHLORINATION FOLLOWED BY CHEMICAL PRECIPITATION *****

Affected waste codes: F007
F008
F009

FACILITY	MAXIMUM ON-SITE TREATMENT CAPACITY	QUANTITY REQUIRING TREATMENT
AMES LAB	0	181,164
ARGONNE NATIONAL LAB - E	0	0
ARGONNE NATIONAL LAB - W	0	0
BROOKHAVEN NATIONAL LAB	0	0
FMPC	0	6,957
HANFORD	0	0
IDAHO NATIONAL ENGINEERING LAB	0	0
ITRI	0	0
KANSAS CITY	0	0
LIVERMORE - SNL	0	0
LOS ALAMOS NATIONAL LAB	0	0
MOUND	0	0
NEVADA TEST SITE	0	0
OAK RIDGE NATIONAL LAB	0	0
PANTEX	0	0
PINELLAS	0	0
ROCKY FLATS	0	338,197
SANDIA NATIONAL LAB	0	4
SAN - LLNL	0	0
SAVANNAH RIVER	0	0
TOTALS:	0	526,318

*** NET CAPACITY: (526,318)

TABLE B-2(n)

DOE NET TREATMENT CAPACITY AT THE END OF 1989
(Quantities expressed in gallons)

***** ALKALINE CHLORINATION FOLLOWED BY STABILIZATION OF METALS *****

Affected waste codes: F006 nonwastewaters

FACILITY	MAXIMUM ON-SITE TREATMENT CAPACITY	QUANTITY REQUIRING TREATMENT
AMES LAB	0	0
ARGONNE NATIONAL LAB - E	0	0
ARGONNE NATIONAL LAB - W	0	0
BROOKHAVEN NATIONAL LAB	0	0
FMPC	0	0
HANFORD	0	0
IDAHO NATIONAL ENGINEERING LAB	0	0
ITRI	0	0
KANSAS CITY	0	0
LIVERMORE - SNL	0	0
LOS ALAMOS NATIONAL LAB	0	0
MOUND	0	0
NEVADA TEST SITE	0	0
OAK RIDGE NATIONAL LAB	0	8,096,145
PANTEX	0	0
PINELLAS	0	0
ROCKY FLATS	0	0
SANDIA NATIONAL LAB	0	0
SAN - LLNL	0	0
SAVANNAH RIVER	0	0
TOTALS:	0	8,096,145

*** NET CAPACITY: (8,096,145)

TABLE B-2(o)

DOE NET TREATMENT CAPACITY AT THE END OF 1989
(Quantities expressed in gallons)

***** SOIL AND DEBRIS *****

Affected waste codes: VARIOUS

FACILITY	MAXIMUM ON-SITE TREATMENT CAPACITY	QUANTITY REQUIRING TREATMENT
AMES LAB	0	132
ARGONNE NATIONAL LAB - E	0	1189
ARGONNE NATIONAL LAB - W	0	0
BROOKHAVEN NATIONAL LAB	0	0
FMPC	0	0
HANFORD	0	0
IDAHO NATIONAL ENGINEERING LAB	0	189,755,309
ITRI	0	0
KANSAS CITY	0	0
LIVERMORE - SNL	0	0
LOS ALAMOS NATIONAL LAB	0	0
MOUND	0	0
NEVADA TEST SITE	0	2,991,222
OAK RIDGE NATIONAL LAB	0	0
PANTEX	0	0
PINELLAS	0	0
ROCKY FLATS	0	0
SANDIA NATIONAL LAB	0	0
SAN - LLNL	0	0
SAVANNAH RIVER	0	314,925
TOTALS:	0	193,062,777

*** SOIL AND DEBRIS REQUIRING TREATMENT: (193,062,777)

ATTACHMENT B-3

REQUESTS FOR NON-DOE MIXED RADIOACTIVE WASTE GENERATION AND TREATMENT DATA: TELEPHONE LOGS

August 22, 1989
Kenneth Singh
Commonwealth of Pennsylvania, Department of Environmental Resources
Bureau of Radiation Protection, Division of Nuclear Safety
200 N. Third Street
Fulton Building, 16th Floor
P.O. Box 2063
Harrisburg, PA 17120
(717) 783-2300

- 1987 Appalachian States Compact Low-Level Radioactive Waste Survey did not get a good response for mixed radioactive wastes. No facility names or locations are provided, nor are there any data tables.
- As of January 1990, generators of radioactive wastes for disposal will have to submit quarterly reports.
- Anticipates having a mixed radioactive waste facility in Pennsylvania by 1995.

August 22, 1989
Ann Constantino
New York State Energy Research and Development Authority
Communications Department
Two Rockefeller Plaza
Albany, NY 12223
(518) 465-6251

- Sending New York State LLW Survey Report (received).

August 22, 1989
Meg Harvey
Connecticut Waste Management Service
Suite 360, 900 Asylum Ave.
Hartford, CT 06105-1904
(203) 244-2007

- Has incomplete data from calendar year 1987. Currently updating data on mixed radioactive wastes. Target date for completion of this update is Oct. 12 (received 1987 data).
- Update of 1988 report will be sent (not received).
- Data will include New England Compact information.

August 22, 1989
Melissa Young
Illinois Department of Nuclear Safety
1035 Outer Park Drive
Springfield, IL 62704
(217) 785-9900

- Her department published a report based on Illinois LLW surveys. However, the report contains little data on mixed radioactive wastes.

- Will send report and mixed radioactive waste survey data (received).

August 22, 1989
Vergil Autry
South Carolina Department of Health and Environmental Control
Office of Radiological Health
Waste Division
(803) 734-5000

- Barnwell site restricts mixed radioactive wastes from disposal.

August 22, 1989
John Vaden
Nevada State Division of Health
Carson City, NV
(702) 885-4475

- License at the Beatty site prohibits mixed radioactive waste disposal.

August 24, 1989
Susan Olsson
Assistant to the Director
Midwest Low-Level Radioactive Waste Commission
350 N. Robert Street, Room 588
St. Paul, MN 55101
(612) 293-0126

- Midwest Compact Commission conducted a survey. She will send data on mixed radioactive waste (received).

- This Compact wants its own waste disposal facility by 1993.

- Estimates that one percent of their radioactive waste stream is mixed radioactive waste.

August 28, 1989
Toby Michelina
Nuclear Regulatory Commission -- Washington State
Olympia, WA
(206) 459-6862

- Mixed wastes were stored at the Hanford disposal facility in the past, but are no longer.

August 31, 1989
Mike Elsen
State of Washington, Department of Health
Olympia, WA
(206) 753-1116

- The Hanford facility accepted scintillation fluids and some oils until 1984-85. However, its restrictions on accepting mixed radioactive wastes are now more stringent than current RCRA requirements.

August 31, 1989
Kathryn Visocki
Executive Director
Southeast Compact Commission for Low-Level Radioactive Waste Management
3901 Barrett Drive, Suite 100
Raleigh, NC 27609
(919) 781-7152

- Doesn't have much information, but will send a report (received).

September 12, 1989
Ed Jennrich and Bob Beard
Rogers and Associates Engineering Corp.
(801) 263-1600

- Indicated that Texas, which is not currently in a Compact, generates approximately 1000 cu. ft./year of mixed radioactive wastes.

- Referred to Arnie Wight of Principaled Negotiations, Inc. as well as heads of various Compacts.

October 5, 1989
Russ Huck
Southwest Compact Commission
Sacramento, CA
(916) 445-0498

- Referred to Envirosphere -- consultants for this Compact.
- No treatment capacity exists for mixed radioactive wastes at this time; this Compact is still in its infancy.

October 5, 1989
Karen Salzer
Rocky Mountain Compact Commission
Denver, CO
(303) 825-1911

- Has no information on mixed radioactive wastes for the Compact.

October 5, 1989
Jay Ringenberg
Chair of the Working Group
Central Compact Commission
Lincoln, NE
(402) 471-3380

- The five states in this Compact generate approximately 150 cu. ft. (1,119 gallons)/year of mixed radioactive waste.
- No information is available on types of hazardous constituents.
- Knows of no available treatment capacity in the Compact region.
- Referred to Gretchen McCabe (OTA), and Edgar Miller of Afton Associates (Washington, D.C.) who is a consultant to the Working Group.

October 6, 1989
Gretchen McCabe
U.S. Congress, Office of Technology Assessment
Washington, D.C.
(202) 228-6852

- New Rogers and Associates low-level mixed radioactive waste report is expected in the next six to eight weeks (at least before Congress' November recess).

- Treatment facilities are still needed for mixed radioactive wastes containing solvents.

- Believes that no commercial treatment facilities are currently allowed to treat mixed radioactive wastes legally.

- Supposedly there is a permitted storage facility in Texas.

- The Scientific Ecology Group facility in Oak Ridge, Tennessee, might build an incinerator.

October 6, 1989
Sarah Hana and Earl Liverman
LLRW Management Program
State of Washington, Department of Ecology
Mail Stop PV-11
Olympia, WA 98504-8711
(206) 459-6861

- Will send reports on mixed radioactive waste in the Northwest Compact (received).

- Knows of no commercial capacity for treatment of mixed radioactive wastes in their Compact.

October 10, 1989
Edgar Miller
Afton & Associates
Washington, D.C.
(Management Consultants of Working Group for Central Compact Commission)
(202) 547 2620

- Says there is a brokerage and processing facility in Texas that claims to be in a position to accept mixed waste.

October 10, 1989
Nancy Kerner and Tim Gould
Envirosphere
(Consultants for Southwest Compact)
Washington (State)
(206) 451-4247

- An initial California survey showed that California generates approximately 22-27,000 cu. ft. (164-200,000 gallons)/year of mixed waste.

- Mixed waste from California is usually transported to the Quadrex facility, via three brokers, where it is stored for radioactive decay, then transferred to a kiln for incineration. The waste is incinerated under the RCRA supplemental fuels exemption. Therefore, there is little waste generated that would require disposal.

- At an old nuclear power plant in Humboldt Bay, CA, oily sludges and chromium are being found.

- Named other potential mixed waste treatment facilities including:

  -- Ramp Industries, Denver, CO

  -- Nuclear Sources and Services, Inc., Houston, TX

  -- Scientific Ecology Group, Oak Ridge, TN

  -- Diversified Scientific Services, Inc., Oak Ridge, TN

October 10, 1989
Arnie Wight
Principaled Negotiations, Inc.
Amherst, New Hampshire
(603) 672-1111

- New Hampshire's mixed radioactive waste is Below Regulatory Concern.

- Referred to Miriam Muneta of the Idaho National Engineering Laboratory.

- Provided data on the annual volume of low-level radioactive waste disposed of in each State.

APPENDIX C

REVISIONS TO REQUIRED CAPACITY SINCE PROMULGATION OF THE SECOND THIRD RULE

APPENDIX C

C. Revisions to Required Capacity Since Promulgation of the Second Third Final Rule

Since promulgation of the Second Third final rule, EPA has received additional waste stream specific data from the Chemical Waste Management facility in Alabama. Based on an analysis of this new information, EPA has adjusted the required capacity section of the capacity analysis. This appendix provides a brief summary of the Chemical Waste Management data and shows how each rule was affected by these data.

The TSDR Survey originally submitted for the Chemical Waste Management facility at Emelle, Alabama (CWM-Emelle) did not contain the necessary waste stream specific data which were to be included in the capacity analysis for the final Third Third and past promulgated rules. The facility indicated that 1986 records which would supply the detailed information requested, were not readily available. For the onsite landfill, the facility provided only those waste codes that are not accepted at the site. For the onsite surface impoundment, the facility provided the waste codes that entered the surface impoundment in 1986, but did not provide waste description codes. This information was inadequate to perform the required capacity section of the capacity analysis.

EPA requested critical capacity information needed to support the land disposal restrictions and CWM-Emelle responded by providing their (1) 1987 Alabama Department of Environmental Management Facility Hazardous Waste

Biennial Report (Biennial Report) and (2) National Survey of Hazardous Waste Generators.

Although the CWM-Emelle Biennial Report was not received in time to be included in prior rules, information provided in the report was used to both update the data reported in previous rulemakings and to conduct the required capacity analysis for the Third Third rule.

The CWM Emelle Biennial Report contains information on waste streams managed at the site in 1987, not 1986 as in the TSDR Survey. Although the Biennial Report contains 1987 data, it is considered to be the best information available from the Emelle facility to estimate required capacity. The Biennial Report contains data on over 3,000 waste streams received or generated at the facility in 1987. The data include a brief description of the waste, the handling method, the applicable RCRA waste code(s), and the volume of the waste received or generated.

The handling method represents the disposition of the waste stream as of the end of 1987. The handling method in over 99 percent of the waste streams received and/or generated at Emelle was landfill. These waste streams require alternative treatment. Other handling methods specified were storage and thermal treatment. Because these are not land placement methods, these waste streams do not require alternative treatment.

The capacity analyses for previous rulemakings did not include Chemical Waste Management quantities requiring alternative treatment technologies. As a result, required capacity for past rules was underestimated and available capacity overestimated. Determination of available capacity for the final Third Third rule accounts for the sequential and cumulative effects of all previous regulations (and for projected capacity changes after 1986, as reported in the TSDR Survey). Therefore, in order to accurately assess available quantity for the Third Third rule, the required treatment capacity reported for the Solvents, California list, First Third, and Second Third rules had to be readjusted to reflect the CWM data. Approximately six of the technologies considered in the Third Third Rule were affected by this adjustment. These technologies and the required capacity adjustments are presented in Table 1.

All wastes reported by the Chemical Waste Management facility were surface-disposed via landfill. Table 2 shows, for each rule, how CWM data affect the quantity of landfilled wastes that require alternative treatment. Tables 3 through 6 summarize all updates to required capacity since the Second Third Final Rule was promulgated. Unless specifically stated, all changes reflect the Chemical Waste Management data.

Table 1 Past Rule Capacity Affected by Chemical Waste Management Data For Those Technologies Included In Chemical Waste Management Data (millions of gallons/year)

Technology	Solvents	Ca. List	First Third	Second Third	Total
Alkaline Chlorination Followed by Chemical Precipitation	0	0	1[a]	1	1
Carbon Adsorption, Followed by Chromium Reduction, and Chemical Precipitation	<1	0	0	0	0
Chemical Precipitation	0	0	0	<1	0
Chromium Reduction Followed by Chemical Precipitation	<1	0	6	<1	6
Combustion of Liquids	1	0	0	0	1
Combustion of Sludge/Solids	1	<1	2	0	3
High Temperature Metals Recovery (Not Secondary Smelting)	0	0	1[b]	0	0
Stabilization	0	0	21	0	21
Wastewater Treatment (for organics)	0	<1	0	0	0
Totals	2	0	31	1	32

Note: Quantities less than 1 million gallons are neither added nor subtracted from capacity totals.

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[a] For the Third Third proposed rule, EPA conducted a worst-case analysis and determined that 12 million gallons of F006 nonwastewaters would require treatment. For the final rule, EPA has reevaluated the volume of F006 nonwastewaters requiring treatment and determined that 1 million gallons of CWM F006 requires alkaline chlorination followed by chemical precipitation. A more detailed discussion of this analysis can be found in the executive summary.

[b] High Temperature Metal Recovery (HTMR) was identified as the BDAT for "high zinc" K061. Because of the shortfall of HTMR capacity, the Agency granted a two-year capacity variance to the HTMR standard for "high zinc" K061. However, during this two-year variance period, the Agency is requiring that "high zinc" K061 meet the standard for "low zinc" K061, which is based on stabilization. Therefore, this additional 1 million gallons of K061 waste has already been accounted for under stabilization.

Table 2 Adjusted Landfill Quantities
Since The Second Third Final Rule
(millions of gallons/year)

	Landfill Quantity Second Third Final Rule[a]	CWM Data	Adjusted Landfill Quantity Second Third Final Rule
Solvents	71	2	57[b]
First Third	302	31[c]	331
Second Third	10	1	11

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[a] Data obtained from Second Third Background Document Final Rule.

[b] For the Second Third Rule, 16 million gallons of waste were assigned to the solvent rule. Because this quantity represents multi-source leachate waste, it was subtracted from the solvent required capacity. This leaves 55 million gallons of land disposed waste landfilled under the solvent rule. The additional 2 million gallons comes from the CWM data.

[c] In the Third Third proposed rule, EPA determined that 41 million gallons of CWM waste would require treatment. This estimate included 12 million gallons of F006 that required alkaline chlorination followed by chemical precipitation capacity. EPA based this 12 million gallon estimate on a worst-case analysis. Since the proposed rule EPA has reevaluated this estimate and determined that 1 million gallons of F006 require alkaline chlorination followed by chemical precipitation. A more detailed discussion of the F006 analysis can be found in the executive summary.

Table 3 Solvents Rule Capacity Numbers For Those Technologies Included In Chem Waste Management Data (millions of gallons/year)

Technology	Required Capacity Excluding CWM data[a]	Required Capacity Based on CWM data	Required Capacity Including CWM data
Carbon Adsorption Followed by Chromium Reduction, and Chemical Precipitation	0	<1	<1
Chromium Reduction Followed by Chemical Precipitation	0	<1	<1
Combustion of Liquids	1	1	2
Combustion of Sludge/Solids	38	1	23[b]

---

[a] Data obtained from Second Third Background Document, Final Rule.

[b] Only 1 million gallons of CWM required capacity was added to combustion of sludge/solids. The remaining 16 million gallon difference is a solvent-contaminated wastewater treatment sludge which results from the treatment of multi-source leachate. Although this quantity was included in the Solvent capacity analysis for the Second Third Rule, this quantity should be evaluated under the Third Third rule. Consequently it is no longer included in the solvent required capacity total.

Table 4 California List Rule Capacity Numbers
For Those Technologies Included In Chem Waste Management Data
(millions of gallons/year)

Technology	Required Capacity Excluding CWM data[a]	Required Capacity Based on CWM data	Required Capacity Including CWM data
Combustion of Sludge/Solids	2	<1	<1[b]
Wastewater Treatment of Organics	7	<1	<1[c]

---

[a] Data obtained from Second Third Background Document, Final Rule.

[b] In the Second Third Final Rule, 2 million gallons of Third Third California List wastes were included in required capacity for combustion of sludge/solids. As this quantity is accounted for in the Third Third Rule, this 2 million gallons is no longer required under the California List rule. Subtracting this 2 million gallons leaves a zero balance. The less than 1 million gallons reported in the Third Third Rule comes from CWM data.

[c] In the Second Third Rule, 7 million gallons of Third Third California List wastes were included in required capacity for wastewater treatment of organics. As this quantity is accounted for in the Third Third rule, this 7 million gallons is subtracted from the California List Rule, leaving a zero balance. The less than 1 million gallons reported in this proposed rule comes from CWM data.

Table 5 First Third Rule Capacity Numbers For Those Technologies Included In Chem Waste Management Data (millions of gallons/year)

Technology	Required Capacity Excluding CWM data[a]	Required Capacity Based on CWM data	Required Capacity Including CWM data
Alkaline Chlorination Followed by Chemical Precipitation	0	1	6[b]
Chromium Reduction and Chemical Precipitation	40	6	46
Combustion of Sludge/Solids	6-160	2	8-162
Combustion of Solids			
High Temperature Metals Recovery (Not Secondary Smelting)	62	1	63[c]
Stabilization	231	21	263[d]

---

[a] Data obtained from Second Third Background Document, Final Rule.

[b] In the Third Third proposed rule, EPA determined that 25 million gallons of First Third wastes would require alkaline chlorination followed by chemical precipitation. EPA conducted a worst-case analysis and determined that 12 million gallons of CWM should be added to the First Third required capacity total. The remaining 13 million gallons represented F006 wastes that had been added since the Second Third Final Rule due to promulgation of the cyanide standard on 6/8/89. Since the proposed rule EPA has reevaluated the required estimate to derive a more realistic estimate of required capacity. EPA has determined that 1 million gallons of CWM should be added to the First Third required capacity total and 6 million gallons added due to the cyanide standard.

[c] High Temperature Metals Recovery (HTMR) was identified as the BDAT for "high zinc" K061. Because of the shortfall of HTMR capacity, the Agency granted a two-year capacity variance to the HTMR standard for "high zinc" K061. However, during this two-year variance period, the Agency is requiring that "high zinc" K061 meet the standard for "low zinc" K061, which is based on stabilization. Therefore, this 1 million gallons has already been accounted for under stabilization.

[d] Only 21 million gallons of CWM was added to the First Third required capacity total. The remaining 11 million gallons represents soils that have been added since the Second Third Final Rule.

Table 6 Second Third Rule Capacity Numbers For Those Technologies Included In Chem Waste Management Data (millions of gallons/year)

Technology	Required Capacity Excluding CWM data[a]	Required Capacity Based on CWM data	Required Capacity Including CWM data
Alkaline Chlorination Followed by Chemical Precipitation[c]	2	1	5[b]
Chemical Precipitation	0	<1	<1
Chromium Reduction and Chemical Precipitation	0	<1	<1
Stabilization	2	0	4[d]

---

[a] Data obtained from Second Third Background Document, Final Rule.

[b] Of the 3 million gallons added to required capacity for alkaline chlorination followed by chemical precipitation, 1 million gallons comes from CWM data, and the remaining 2 million gallons are soil and debris.

[c] Titled alkaline chlorination in Second Third Rule.

[d] This additional 2 million gallons is due to soil and debris waste not included in the Second Third Rule, not CWM data.

APPENDIX D

Capacity Analysis by Technology Per Waste Code For Third Third Wastes

APPENDIX D

The tables in this appendix present the results of the analysis of required capacity for each alternative technology on a waste code-by-waste code basis. The tables show the amount of required treatment capacity for the wastes for which treatment standards are being for the Third Third rule. The tables also total the amount of required capacity for each technology.

The original TSDR Survey data were sorted by waste code, waste description code, and type of alternative treatment required to generate these tables. Computer printouts showing the original TSDR Survey data for the Third Third promulgated wastes are contained in the "Analysis of the Required Capacity Data for the Third Third Wastes Final Rule" contained in the docket. The data were then combined and summarized to create the technology-specific capacity analysis tables for the Third Third wastes contained in Section 2 of this document.

Table D-1 Capacity Analysis for Alkaline Chlorination
(Excluding Soil and Debris)

Type of Alternative Treatment/Recovery	Surface-disposed Volume Requiring Alternative Capacity (gallons/year)	Deepwell-disposed Volume Requiring Alternative Capacity (gallons/year)
D002a	0	62,400
D003a	151,680	47,574,160
F019	6,330,375	0
TOTALS:	6,482,055	47,636,560

D002a is D002 acids and alkalines

D003a is D003 cyanides

Table D-2 Capacity Analysis for Alkaline Chlorination followed by Chemical Precipitation (Excluding Soil and Debris)

Type of Alternative Treatment/Recovery	Surface-disposed Volume Requiring Alternative Capacity (gallons/year)	Deepwell-disposed Volume Requiring Alternative Capacity (gallons/year)
F006a	1,548,179	500,288
F019	1,812	1,440
TOTALS:	1,549,991	501,728

F006a is F006 cyanides and metals

Table D-3 Capacity Analysis for Beryllium Recovery
(Excluding Soil and Debris)

Type of Alternative Treatment/Recovery	Surface-disposed Volume Requiring Alternative Capacity (gallons/year)	Deepwell-disposed Volume Requiring Alternative Capacity (gallons/year)
P015	1,778	0
TOTALS:	1,778	0

Table D-4 Capacity Analysis for Biological Treatment
(Excluding Soil and Debris)

Type of Alternative Treatment/Recovery	Surface-disposed Volume Requiring Alternative Capacity (gallons/year)	Deepwell-disposed Volume Requiring Alternative Capacity (gallons/year)
D004	204	0
D005	204	0
P003	240	0
P020	0	100,000
P048	0	110,040
U002	0	100,000
U009	0	23,760
U019	0	4,320
U031	0	100,000
U051	24,417	0
U057	160	0
U112	0	76
U140	0	1,000,000
U159	204	0
U170	0	342,000
U188	0	200,000
U220	0	9,240
U239	0	90,960
TOTALS:	25,429	2,080,396

Table D-5 Capacity Analysis for Biological Treatment Followed by Chemical Precipitation (Excluding Soil and Debris)

Type of Alternative Treatment/Recovery	Surface-disposed Volume Requiring Alternative Capacity (gallons/year)	Deepwell-disposed Volume Requiring Alternative Capacity (gallons/year)
F039	797,690	15,100,000
TOTALS:	797,690	15,100,000

Table D-6 Capacity Analysis for Chemical Oxidation Followed by Chemical Precipitation (Excluding Soil and Debris)

Type of Alternative Treatment/Recovery	Surface-disposed Volume Requiring Alternative Capacity (gallons/year)	Deepwell-disposed Volume Requiring Alternative Capacity (gallons/year)
D001b	560	0
D002a	210,758	89,242,840
D003b	6,677,720	1,593,538,840
D004	0	640
D005	3,078	0
D006a	657	400,000
D007a	0	400,000
D008a	0	400,000
D010	0	400,000
D011	612	0
P006	47,280	0
P105	480	0
P115	4,800	0
P122	0	7,920
TOTALS:	6,945,945	1,684,390,240

D001b is D001 reactives, oxidizers

D002a is D002 acids and alkalines

D003b is D003 sulfides

D006a is D006 cadmium non-batteries

D007a is D007 chromium

D008a is D008 lead non-batteries

Table D-7 Capacity Analysis for Chemical Oxidations Followed by Chromium Reduction and Chemical Precipitation (Excluding Soil and Debris)

Type of Alternative Treatment/Recovery	Surface-disposed Volume Requiring Alternative Capacity (gallons/year)	Deepwell-disposed Volume Requiring Alternative Capacity (gallons/year)
D001b	31,000	0
D002a	610,976	97,601,820
D003c	1,089,444	97,604,340
D005	54,540	0
D006a	68,569	4,980
D007a	65,851	5,880
D008a	0	40,020
D009a	0	35,040
TOTALS:	1,920,380	195,292,080

D001b is D001 reactives, oxidizers

D002a is D002 acids and alkalines

D003c is D003 reactives

D006a is D006 cadmium non-batteries

D007a is D007 chromium

D008a is D008 lead non-batteries

D009a is D009 high concentration mercury

Table D-8 Capacity Analysis for Chemical Precipitation
(Excluding Soil and Debris)

Type of Alternative Treatment/Recovery	Surface-disposed Volume Requiring Alternative Capacity (gallons/year)	Deepwell-disposed Volume Requiring Alternative Capacity (gallons/year)
D002a	1,021,257	7,001,533
D004	554,868	9,789,360
D005	8,426,348	276,420
D006a	1,341,262	128,900
D008a	12,124,068	2,206,073
D009a	914,117	1,045 600
D010	297,476	93,56[illegible]60
D011	802,043	23[illegible]60
F006b	0	3,001,731
K031	0	1,047,360
P056	0	14,040
U134	964	210,720
U151	0	100,000
TOTALS:	25,482,403	118,618,457

D002a is D002 acids and alkalines

D006a is D006 cadmium non-batteries

D008a is D008 lead non-batteries

D009a is D009 high concentration mercury

F006b is F006 treated cyanides and metals

Table D-9 Capacity Analysis for Chromium Reduction and Chemical Precipitation (Excluding Soil and Debris)

Type of Alternative Treatment/Recovery	Surface-disposed Volume Requiring Alternative Capacity (gallons/year)	Deepwell-disposed Volume Requiring Alternative Capacity (gallons/year)
D002a	1,198,275	36,077,869
D004	61,918	16,740
D005	187,563	961,968
D006a	1,400,950	1,033,388
D007a	59,344,986	198,233,898
D008a	3,053,865	1,021,185
D009a	35,245	63,717
D010	15,349	334,341
D011	121,414	28,860
F006c	18,750,000	1,500,865
K002	130,320	130,680
K003	130,320	0
K004	115,200	0
K005	115,200	0
K006	115,200	0
P011	0	3,600
U032	101	15,480
TOTALS:	84,775,906	239,422,591

D002a is D002 acids and alkalines

D006a is D006 cadmium non-batteries

D007a is D007 chromium

D008a is D008 lead non-batteries

D009a is D009 high concentration mercury

F006c is F006 with chromium

Table D-10 Capacity Analysis for Combustion of Liquids (Excluding Soil and Debris)

Type of Alternative Treatment/Recovery	Surface-disposed Volume Requiring Alternative Capacity (gallons/year)	Deepwell-disposed Volume Requiring Alternative Capacity (gallons/year)
D001a	6,897,000	6,897,000
D002a	37,478	104,880
D003a	1,180,422	7,004,320
D004	659	48,160
D006a	59,320	10,920
D007a	91,432	31,300
D008a	223,823	10,380
D010	1,369	9,600
K032	0	5,360
K083	0	5,000,000
K097	0	26,480
K105	4,560	0
P003	240	0
P005	0	27,000
P020	317	0
P024	480	0
P050	0	377,533
P051	0	9,216
P059	0	377,533
U001	0	534,480
U002	644	0
U008	100	0
U009	45,840	0
U012	1,640	100,000
U019	3,935	775,440
U031	134	0
U037	0	33,120
U043	5,480	0
U044	4,320	129,600
U045	0	17,600
U047	72	0
U048	183	0
U051	24,417	0
U052	93,141	0
U057	160	0
U066	1,324	0
U067	26	0
U070	456	100,000
U073	240	0
U074	0	50,400
U077	311	0
U080	2,658,635	2,754,520
U105	0	100,000
U106	0	100,000
U108	4,805	0
U112	273	178
U113	0	4,500
U118	0	240
U121	370	0
U122	7,968	100,000

U123	1,533	0
U125	251	0
U131	103	0
U138	0	100,000
U140	40	0
U142	240	0
U154	30,183	1,738
U157	0	100,000
U158	41	0
U159	1,832	3,780
U161	1,581	0
U162	4,320	100,000
U165	85	540
U169	1,054	100,000
U170	26,640	0
U180	240	0
U185	0	1,000,000
U188	3,885	0
U192	0	100,000
U196	480	0
U197	0	100,000
U201	23	0
U210	2,331	1,000,000
U211	12,551	111,520
U220	31,346	20,290
U225	12	0
U226	5,640	100,000
U227	2,658,120	2,654,520
U228	1,493	1,200
U239	158,147	69,360
U247	93	0
TOTALS:	14,293,838	30,302,708

D001a is D001 ignitables

D002a is D002 acids and alkalines

D003a is D003 cyanides

D006a is D006 cadmium non-batteries

D007a is D007 chromium

D008a is D008 lead non-batteries

Table D-11 Capacity Analysis for Combustion of Sludges
(Excluding Soil and Debris)

Type of Alternative Treatment/Recovery	Surface-disposed Volume Requiring Alternative Capacity (gallons/year)	Deepwell-disposed Volume Requiring Alternative Capacity (gallons/year)
D001a	6,946,818	0
D002a	26,192	0
D003c	85,404	0
D004	65,555	0
D006a	135,211	0
D007a	533,487	0
D008a	459,209	0
D010	4,146	0
F019	1,680	0
K035	1,920	0
K073	1,723	0
P048	2,549	0
P077	4,560	0
P088	240	0
U004	139	0
U012	303	0
U019	2,018	0
U051	13,604	0
U080	290	0
U105	2,160	0
U122	29	0
U144	19	0
U159	36	0
U165	8,330	0
U188	6,553	0
U210	123	0
U211	171	0
U220	12,716	0
U226	384	0
U228	261	0
U239	12,469	0
TOTALS:	8,328,299	0

D001a is D001 ignitables

D002a is D002 acids and alkalines

D003c is D003 explosives, water reactives, other reactives

D006a is D006 cadmium non-batteries

D007a is D007 chromium

D008a is D008 lead non-batteries

Table D-12 Capacity Analysis for Combustion of Solids (Excluding Soil and Debris)

Type of Alternative Treatment/Recovery	Surface-disposed Volume Requiring Alternative Capacity (gallons/year)	Deepwell-disposed Volume Requiring Alternative Capacity (gallons/year)
D001a	5,779,183	0
D002a	162,640	0
D004	57,759	0
D006a	130,954	0
D007a	260,620	0
D008a	300,133	0
D010	1,952	0
K017	68,400	0
K021	16,951	0
K048	33,407,730	0
K049	28,455,250	0
K050	10,611,680	0
K051	70,279,848	0
K052	11,207,805	0
K085	99,600	0
P001	16	0
P004	1,981	0
P005	1,476	0
P020	20,100	0
P024	3,120	0
P037	6,633	0
P048	1,415	0
P050	6,065	0
P051	6,404	0
P059	1,307	0
P077	24	0
P088	821	0
P123	1,680	0
U001	31	0
U002	2,253	0
U003	109	0
U005	89	0
U008	1,586	0
U009	2,907	0
U012	8,370	0
U019	928	0
U022	1,574	0
U029	665	0
U030	339	0
U031	11,594	0
U036	7,821	0
U037	5,844	0
U039	61	0
U043	240	0
U044	5,886	0
U048	37	0
U051	74,547	0
U052	1,090	0
U057	16	0
U061	6,326	0

U067	48	0
U070	53	0
U071	800	0
U072	219,865	0
U073	225	0
U075	240	0
U076	8,880	0
U077	12,240	0
U078	480	0
U079	16	0
U080	14,786	0
U081	11,381	0
U082	19	0
U083	3,920	0
U093	60	0
U101	9,280	0
U106	60	0
U112	1,794	0
U117	30	0
U118	827	0
U120	158	0
U122	39,590	0
U123	1,422	0
U126	26,549	0
U127	743	0
U129	1,597	0
U131	144,000	0
U134	24	0
U140	30	0
U144	1,797	0
U147	14,550	0
U154	2,755	0
U158	252,464	0
U159	31,651	0
U162	1,034	0
U165	29,880	0
U167	404	0
U169	527	0
U170	297	0
U181	314	0
U182	1,520	0
U185	37	0
U188	234,340	0
U192	2,438	0
U196	1,335	0
U201	144	0
U208	48	0
U209	4,800	0
U210	4,159	0
U211	2,400	0
U213	240	0
U220	89,807	0
U226	9,976	0
U228	3,660	0
U239	65,271	0
U247	336	0
U248	13,525	0
TOTALS:	162,292,686	0

D001a is D001 ignitables

D002a is D002 acids and alkalines

D006a is D006 cadmium non-batteries

D007a is D007 chromium

D008a is D008 lead non-batteries

Table D-13 Capacity Analysis for Incineration of Liquids
(Excluding Soil and Debris)

Type of Alternative Treatment/Recovery	Surface-disposed Volume Requiring Alternative Capacity (gallons/year)	Deepwell-disposed Volume Requiring Alternative Capacity (gallons/year)
D002a	0	24,000
D005	33,705	0
D011	4,489	8,540
D012	0	2,333,333
D013	0	2,333,333
D014	1,920,000	2,390,213
D015	0	2,333,333
D016	0	2,333,333
D017	0	2,333,333
K086	0	237,600
P057	0	9,216
P064	36	0
P069	240	100,000
P073	7,200	0
P075	0	1,440
P102	0	84,240
U006	503	0
U007	0	100,000
U008	0	100,000
U034	0	17,600
U055	0	100,000
U056	0	12,624
U092	240	0
U103	12	1,560
U109	2,160	0
U115	0	8,000,000
U122	1,494	0
U123	286	0
U133	1,450	100,000
U147	0	480
U154	0	339,600
U156	1,440	0
U160	0	12
U194	0	9,120
U200	0	315,600
U219	76	240
U244	0	13,920
TOTALS:	1,973,331	23,632,670

D002a is D002 acids and alkalines

Table D-14 Capacity Analysis for Incineration of Sludges (Excluding Soil and Debris)

Type of Alternative Treatment/Recovery	Surface-disposed Volume Requiring Alternative Capacity (gallons/year)	Deepwell-disposed Volume Requiring Alternative Capacity (gallons/year)
D004	6	0
D005	23,545	0
D007a	6	0
D008a	3	0
D009a	3	0
D011	21,845	0
P012	31	0
P022	6,720	0
P075	87	0
P108	29	0
U007	516	0
U240	1,440	0
U244	140	0
TOTALS:	54,371	0

D007a is D007 chromium

D008a is D008 lead non-batteries

D009a is D009 high concentration mercury

Table D-15 Capacity Analysis for Incineration of Solids (Excluding Soil and Debris)

Type of Alternative Treatment/Recovery	Surface-disposed Volume Requiring Alternative Capacity (gallons/year)	Deepwell-disposed Volume Requiring Alternative Capacity (gallons/year)
D005	64,858	0
D011	265	0
D012	452,131	0
D013	442,885	0
D014	10,403	0
D015	1,246	0
D016	223,613	0
D017	441,973	0
F039	40,603,809	0
P002	100	0
P014	17,572	0
P018	955	0
P022	6,380	0
P028	720	0
P031	191	0
P047	5,265	0
P058	80	0
P064	1,010	0
P066	11,902	0
P067	66	0
P070	98	0
P081	480	0
P093	42	0
P105	164	0
P108	5,732	0
U007	23,404	0
U010	112	0
U014	24	0
U021	4,199	0
U055	205,953	0
U056	789	0
U103	1,910	0
U114	4,134	0
U116	254	0
U119	49	0
U133	264	0
U148	44	0
U149	33,600	0
U177	1,520	0
U202	60	0
U218	60	0
U219	1,817	0
U234	41	0
U237	463	0
U238	205	0
U240	55,870	0
U244	86	0
U249	55	0
TOTALS:	42,626,853	0

Table D-16 Capacity Analysis for Mercury Retorting
(Excluding Soil and Debris)

Type of Alternative Treatment/Recovery	Surface-disposed Volume Requiring Alternative Capacity (gallons/year)	Deepwell-disposed Volume Requiring Alternative Capacity (gallons/year)
D002a	38,262	0
D005	34,803	0
D006a	49,489	493
D007a	49,600	494
D008a	200,088	1,195
D009a	2,047,161	19,063
D011	392	0
K106a	446,236	0
P092	1,776	0
U007	1	0
U008	2	0
U019	6	0
U144	2	0
U151a	33,759	0
TOTALS:	2,901,577	21,245

D002a is D002 acids and alkalines

D006a is D006 cadmium non-batteries

D007a is D007 chromium

D008a is D008 lead non-batteries

D009a is D009 high concentration mercury

K106a is K106 high concentration mercury

U151a is U151 high concentration mercury

Table D-17 Capacity Analysis for Neutralization
(Excluding Soil and Debris)

Type of Alternative Treatment/Recovery	Surface-disposed Volume Requiring Alternative Capacity (gallons/year)	Deepwell-disposed Volume Requiring Alternative Capacity (gallons/year)
D002a	21,975,340	1,638,365,360
TOTALS:	21,975,340	1,638,365,360

D002a is D002 acids and alkalines

Table D-18 Capacity Analysis for Secondary Smelting
(Excluding Soil and Debris)

Type of Alternative Treatment/Recovery	Surface-disposed Volume Requiring Alternative Capacity (gallons/year)	Deepwell-disposed Volume Requiring Alternative Capacity (gallons/year)
D002a	9,070	0
D005	7,680	0
D006a	565,789	0
D008a	499,944	0
D008b	573,479	0
TOTALS:	1,655,962	0

D002a is D002 acids and alkalines

D006a is D006 cadmium non-batteries

D008a is D008 lead non-batteries

D008b is D008 lead acid batteries

Table D-19 Capacity Analysis for Stabilization
(Excluding Soil and Debris)

Type of Alternative Treatment/Recovery	Surface-disposed Volume Requiring Alternative Capacity (gallons/year)	Deepwell-disposed Volume Requiring Alternative Capacity (gallons/year)
D002a	65,752	0
D006a	9,867,329	0
D007a	11,316,562	0
D008a	49,494,459	22,061
D010	1,728,461	935,812
D011	94,357	0
F024	16,945	0
F039	288,000	0
K002	82,320	0
K003	82,320	0
K006	91,920	0
K069	41	0
K083	15,146	631
P115	48	0
P119	106	0
P120	63,951	0
U146	287	0
U204	110	0
U214	16	0
U217	240	0
TOTALS:	73,208,370	958,504

D002a is D002 acids and alkalines

D006a is D006 cadmium non-batteries

D007a is D007 chromium

D008a is D008 lead non-batteries

Table D-20 Capacity Analysis for Stabilization of Incinerator Ash
(Excluding Soil and Debris)

Type of Alternative Treatment/Recovery	Surface-disposed Volume Requiring Alternative Capacity (gallons/year)	Deepwell-disposed Volume Requiring Alternative Capacity (gallons/year)
D005	11,824	0
D006a	233,845	17
D007a	272,685	874
D008a	275,594	10
D011	2,207	0
F019	168	0
F039	4,060,380	0
K017	12,528	0
K021	3,390	0
K048	3,340,773	0
K049	2,983,115	0
K050	1,086,370	0
K051	7,163,678	0
K052	1,139,558	0
K083	0	50,000
K086	0	2,376
P064	1,212	0
U004	14	0
U006	5	0
U019	39	0
U044	24	0
U051	16,513	0
U077	768	0
U080	3	0
U122	0	2
U144	372	0
U158	49,248	0
U181	63	0
U188	2,517	0
U220	40	0
U239	114	0
TOTALS:	20,657,047	53,279

D006a is D006 cadmium non-batteries

D007a is D007 chromium

D008a is D008 lead non-batteries

Table D-21 Capacity Analysis for Stabilization of Retort Slag (Excluding Soil and Debris)

Type of Alternative Treatment/Recovery	Surface-disposed Volume Requiring Alternative Capacity (gallons/year)	Deepwell-disposed Volume Requiring Alternative Capacity (gallons/year)
D005	34,632	0
D006a	45,802	657
D007a	76,519	658
D008a	1,333,835	2,060
D011	1,406	0
U007	9	0
U008	9	0
U019	63	0
U144	364	0
TOTALS:	1,492,639	3,375

D006a is D006 cadmium non-batteries

D007a is D007 chromium

D008a is D008 lead non-batteries

Table D-22 Capacity Analysis for Stabilization of Scrubber Water Treatment Sludge (Excluding Soil and Debris)

Type of Alternative Treatment/Recovery	Surface-disposed Volume Requiring Alternative Capacity (gallons/year)	Deepwell-disposed Volum Requiring Alternative Capa (gallons/year)
D005	7,158	0
D006a	23,131	17
D007a	31,387	874
D008a	213,625	10
D011	266	24
F019	17	0
F039	406,038	0
K017	626	0
K021	170	0
K048	334,077	0
K049	284,553	0
K050	106,117	0
K051	702,798	0
K052	112,078	0
K083	0	50,000
K086	0	2,376
P064	60	0
U004	1	0
U006	5	0
U019	39	0
U044	1	0
U051	1,125	0
U077	38	0
U080	3	0
U122	0	2
U158	2,462	0
U181	3	0
U188	126	0
U220	40	0
U239	44	0
TOTALS:	2,225,988	53,303

D006a is D006 cadmium non-batteries

D007a is D007 chromium

D008a is D008 lead non-batteries

Table D-23 Capacity Analysis for Stabilization of Wastewater Treatment Sludge (Excluding Soil and Debris)

Type of Alternative Treatment/Recovery	Surface-disposed Volume Requiring Alternative Capacity (gallons/year)	Deepwell-disposed Volume Requiring Alternative Capacity (gallons/year)
D005	6,325,600	14,723
D006a	574,809	15,847
D007a	44,479,848	2,475,797
D008a	2,128,898	31,931
D011	153,955	366
F006a	10,063	0
F019	6,267,089	14
K002	23,605	2,614
K003	23,605	0
K004	1,152	0
K005	1,152	0
K006	1,152	0
U032	1,426	235
U159	2	0
TOTALS:	59,992,356	2,541,527

D006a is D006 cadmium non-batteries

D007a is D007 chromium

D008a is D008 lead non-batteries

F006a is F006 cyanides

Table D-24 Capacity Analysis for Thermal Recovery
(Excluding Soil and Debris)

Type of Alternative Treatment/Recovery	Surface-disposed Volume Requiring Alternative Capacity (gallons/year)	Deepwell-disposed Volume Requiring Alternative Capacity (gallons/year)
P087	2,600	0
TOTALS:	2,600	0

Table D-25 Capacity Analysis for Thermal recovery of cadmium batteries (Excluding Soil and Debris)

Type of Alternative Treatment/Recovery	Surface-disposed Volume Requiring Alternative Capacity (gallons/year)	Deepwell-disposed Volume Requiring Alternative Capacity (gallons/year)
D006b	14,278	0
TOTALS:	14,278	0

D006b is D006 cadmium batteries

Table D-26 Capacity Analysis for Vitrification
(Excluding Soil and Debris)

Type of Alternative Treatment/Recovery	Surface-disposed Volume Requiring Alternative Capacity (gallons/year)	Deepwell-disposed Volume Requiring Alternative Capacity (gallons/year)
D001b	655	0
D002a	157,264	0
D003a	23,380	0
D004	12,072,431	150,796
D005	1,206,300	14
D006a	1,753,273	5,441
D007a	1,872,888	5,190
D008a	2,161,060	10,204
D009a	1,080,616	0
D011	1,309,530	228
K031	620,258	10,474
K084	213,912	0
P010	1,117	0
P011	2,048	72
P012	3,228	0
P108	6	0
U022	461	0
U051	73	0
U120	26	0
U144	2	0
U159	2	0
U169	4	0
U188	6	0
TOTALS:	22,478,540	182,419

D001b is D001 reactives, oxidizers

D002a is D002 acids and alkalines

D003a is D003 cyanides

D006a is D006 cadmium non-batteries

D007a is D007 chromium

D008a is D008 lead non-batteries

D009a is D009 high concentration mercury

Table D-27 Capacity Analysis for Wet Air Oxidation (only)
(Excluding Soil and Debris)

Type of Alternative Treatment/Recovery	Surface-disposed Volume Requiring Alternative Capacity (gallons/year)	Deepwell-disposed Volume Requiring Alternative Capacity (gallons/year)
D002a	0	55,990,320
K011	0	433,204,160
K013	0	407,166,320
K014	0	130,950,320
TOTALS:	0	1,027,311,120

D002a is D002 acids and alkalines

Table D-28 Capacity Analysis for Wet Air Oxidation followed by Carbon Adsorption (Excluding Soil and Debris)

Type of Alternative Treatment/Recovery	Surface-disposed Volume Requiring Alternative Capacity (gallons/year)	Deepwell-disposed Volume Requiring Alternative Capac (gallons/year)
P058	0	12,720

APPENDIX E

Capacity Analysis by Technology Per Waste Code For Contaminated Soil Wastes

APPENDIX E

The tables in this appendix present the results of the analysis of required capacity for each alternative technology for contaminated soils. The tables show the amount of required capacity for each technology.

To generate these tables, the original TSDR Survey data were sorted by waste code, waste description code (i.e., those described as soils), and type of alternative treatment required. Computer printouts showing the original TSDR Survey data for the Third Third wastes are contained in the "Analysis of Required Capacity Data for the Third Third Wastes Final Rule" contained in the docket. The data were then combined and summarized to create the technology-specific capacity analysis tables for contaminated soils contained in Section 2 of this document.

Table E-1 Capacity Analysis for Alkaline Chlorination of Soils
(Soil and Debris only)

Type of Alternative Treatment/Recovery	Volume Requiring Alternative Capacity (gallons/year)
F019	59,994
TOTALS:	59,994

Table E-2 Capacity Analysis for Chem. Oxidation Followed by Chromium Reduction and Chem. Precipitation (Soil and Debris only)

Type of Alternative Treatment/Recovery	Volume Requiring Alternative Capacity (gallons/year)
D003c	130,080
TOTALS:	130,080

D003c is D003 reactives

Table E-3 Capacity Analysis for Chromium Reduction and Chemical Precipitation of Soils (Soil and Debris only)

Type of Alternative Treatment/Recovery	Volume Requiring Alternative Capacity (gallons/year)
D002a	142,939
D004	88,512
D005	209,811
D006a	336,396
D007a	982,669
D008a	382,315
D009a	5,370
TOTALS:	2,148,012

D002a is D002 acids and alkalines

D006a is D006 cadmium non-batteries

D007a is D007 chromium

D008a is D008 lead non-batteries

D009a is D009 high concentration mercury

Table E-4 Capacity Analysis for Incineration of Soil/Debris
(Soil and Debris only)

Type of Alternative Treatment/Recovery	Volume Requiring Alternative Capacity (gallons/year)
D001a	1,489,128
D002a	2,400
D003c	3,160
D004	1,051
D005	1,791
D006a	12,906
D007a	63,646
D012	164,958
D013	381,892
K035	310,560
P012	27
P020	50,880
P022	138,720
P037	403
P047	8,625
P048	1,920
P051	87,211
P054	1,200
P064	5,050
P070	437,520
P108	5,625
P122	960
P123	477
U002	22,999
U003	720
U008	95,203
U009	221,211
U019	131,001
U022	461
U031	602
U036	877
U044	382
U050	461
U051	1,881,258
U052	617,510
U060	17,149
U061	17,178
U070	480
U080	4,419
U103	1,863
U105	11,398
U106	10,920
U108	720
U114	4,347
U118	180
U120	461
U122	27,128
U123	1,677
U125	4,320
U129	403
U147	1,200
U154	7,440
U159	375,972
U161	7,440
U162	127,981
U165	438,098

U181	315
U188	470,942
U220	312,619
U228	44,280
U239	290,492
U248	480
TOTALS:	8,322,697

D001a is D001 ignitables

D002a is D002 acids and alkalines

D003c is D003 reactives

D006a is D006 cadmium non-batteries

D007a is D007 chromium

Table E-5 Capacity Analysis for Mercury Retorting of Soil/Debris (Soil and Debris only)

Type of Alternative Treatment/Recovery	Volume Requiring Alternative Capacity (gallons/year)
D002a	60
D005	1,140
D006a	5,024
D007a	5,084
D008a	441,212
D009a	3,051,369
K106a	9,600
U151a	4,242
TOTALS:	3,517,731

D002a is D002 acids and alkalines

D006a is D006 cadmium non-batteries

D007a is D007 chromium

D008a is D008 lead non-batteries

D009a is D009 high concentration mercury

K106a is K106 high concentration mercury

U151a is U151 high concentration mercury

Table E-6 Capacity Analysis for Neutralization of Soil/Debris
(Soil and Debris only)

Type of Alternative Treatment/Recovery	Volume Requiring Alternative Capacity (gallons/year)
D002a	23,401
TOTALS:	23,401

D002a is D002 acids and alkalines

Table E-7 Capacity Analysis for Secondary Smelting of Soils
(Soil and Debris only)

Type of Alternative Treatment/Recovery	Volume Requiring Alternative Capacity (gallons/year)
D008b	59,162
TOTALS:	59,162

D008b is D008 lead acid batteries

Table E-8 Capacity Analysis for Stabilization of Retort Slag (Soils)
(Soil and Debris only)

Type of Alternative Treatment/Recovery	Volume Requiring Alternative Capacity (gallons/year)
D005	12,252
D006a	6,699
D007a	6,699
TOTALS:	25,650

D006a is D006 cadmium non-batteries

D007a is D007 chromium

Table E-9 Capacity Analysis for Stabilization of Soil/Debris
(Soil and Debris only)

Type of Alternative Treatment/Recovery	Volume Requiring Alternative Capacity (gallons/year)
D001a	27
D002a	2,787
D005	273,833
D006a	250,461
D007a	27,856
D008a	9,631,111
D010	6,694
F019	29,997
P011	0
P012	0
P110	480
P122	0
U032	1,440
U051	1,862,445
U052	10,930
U144	267
U151a	80
TOTALS:	12,098,408

D001a is D001 ignitables

D002a is D002 acids and alkalines

D006a is D006 cadmium non-batteries

D007a is D007 chromium

D008a is D008 lead non-batteries

U151a is U151 high concentration mercury

Table E-10 Capacity Analysis for Stabilization of Wastewater Treatment Sludge and Soils (Soil and Debris only)

Type of Alternative Treatment/Recovery	Volume Requiring Alternative Capacity (gallons/year)
D006a	67,788
D007a	70,277
D008a	85,683
F019	6,400
U032	6,998
TOTALS:	237,146

D006a is D006 cadmium non-batteries

D007a is D007 chromium

D008a is D008 lead non-batteries

Table E-11 Capacity Analysis for Thermal Recovery from Soils
(Soil and Debris only)

Type of Alternative Treatment/Recovery	Volume Requiring Alternative Capacity (gallons/year)
P015	1,440
TOTALS:	1,440

Table E-12 Capacity Analysis for Thermal Recovery of Chromium Bricks
(Soil and Debris only)

Type of Alternative Treatment/Recovery	Volume Requiring Alternative Capacity (gallons/year)
D007b	3,000,000
TOTALS:	3,000,000

D007b is D007 chromium refractory bricks

Table E-13 Capacity Analysis for Vitrification of Soil/Debris
(Soil and Debris only)

Type of Alternative Treatment/Recovery	Volume Requiring Alternative Capacity (gallons/year)
D001a	576
D002a	680
D004	469,597
D005	40,610
D006a	43,095
D007a	104,466
D008a	89,344
D009a	17,699
D011	51
P011	2,880
P012	56,400

D001a is D001 ignitables

D002a is D002 acids and alkalines

D006a is D006 cadmium non-batteries

D007a is D007 chromium

D008a is D008 lead non-batteries

D009a is D009 high concentration mercury

APPENDIX F

Documentation of Waste Volumes for Waste Codes Addressed in Previous Rules

EPA is promulgating revised or additional standards for the wastewater and nonwastewater forms of several waste codes for which standards were promulgated in a previous rule. In addition, EPA is promulgating standards for the waste codes for which the wastewaters or nonwastewaters have been soft hammered in a previous rule. Because waste volumes for these codes were considered in a previous capacity analysis, waste volumes for these codes were initially excluded from the Third Third capacity data. Although these volumes have been included in the baseline study, they have been reanalyzed and included in the Third Third capacity analysis for the sake of completion. This appendix presents the waste volumes for the waste codes that were considered in a previous capacity analysis. Section F.1 presents tables (Tables F-1, F-2, F-3, F-4) listing waste codes, and associated volumes disposed of waste codes which have been evaluated in previous rules. This section also includes documentation for waste codes whose volumes had been initially evaluated in the capacity analysis for a previous rule. These volumes were previously considered because they were mixed with a waste code promulgated in a previous rule. Table F.1 lists surface disposed California list HOC's and Table F.2 lists all other surface disposed wastes. Table F.3 lists the deepwell-injected California list HOC's and Table F-4 lists all remaining deepwell-injected wastes. Section F.2 lists surface disposed waste codes for for which volumes requiring alternative treatment were based on the capacity analysis from previous the rule. Discussions explain the use of volumes from past capacity analyses in the capacity analysis for Third Third proposed rule. In cases where a waste code exists in a waste stream with other wastes, volumes were divided equally between the wastes before being added to the capacity analysis.

TABLE F-1
REQUEST D0906A
DATA SOURCE: TSDR SURVEY CAPACITY DATA SET
WASTE STREAMS WITH SPECIFIED WASTE CODES IN BOOKS J-N
SURFACE DISPOSED CALIFORNIA LIST HOC WASTES
NON-CBI FACILITIES ONLY
ALL VOLUMES ARE IN GALLONS

Facility ID	Facility Name	Book	Question	Key Letter	Waste Code	Waste Desc	1986 Quantity
OHD045243706	Envirosafe Services of Ohio, Inc. Waste Codes: D016,D017	L	35	CT	D017	B36	1,680
NYD080336241	Cecos International Waste Codes: P050	L	31	U	P050	A08	5,172
NVT330010000	US Ecology Chem Site Inc. Waste Codes: D001,D002,D007, U122,U151,U044,U080,D009,P030, U144,U188,U165,P077,U007,P058	L	35	AH	P058	B88	1,200
NYD080336241	Cecos International Waste Codes: P059	L	31	V	P059	A08	48
NYD080336241	Cecos International Waste Codes: U043	L	31	AL	U043	A08	108
WA7890008967	USDOE Waste Codes: U043	L	31	D	U043	A13	240
NYD080336241	Cecos International Waste Codes: U047	L	31	AN	U047	A08	72

TABLE F-1

REQUEST D0906A
DATA SOURCE: TSDR SURVEY CAPACITY DATA SET
WASTE STREAMS WITH SPECIFIED WASTE CODES IN BOOKS J-N
SURFACE DISPOSED CALIFORNIA LIST HOC WASTES
NON-CBI FACILITIES ONLY
ALL VOLUMES ARE IN GALLONS

Facility ID	Facility Name	Book	Question	Key Letter	Waste Code	Waste Desc	1986 Quantity
NVT330010000	US Ecology Chem Site Inc. Waste Codes: D001,U122,U159, U002,D002,D005,D008,P104,D007, D011,U080,U228,U048	L	35	W	U048	B88	480
NYD080336241	Cecos International Waste Codes: U048	L	31	AO	U048	A08	26
NYD080336241	Cecos International Waste Codes: U067	L	31	AS	U067	A08	26
TXD069452340	Texas Ecologists Inc. Waste Codes: D001,D002,U037, U077,U067	L	35	11	U067	B36	240
AZD980665814	University of Arizona Waste Codes:D001,U002, D003,U151,U075	L	35	A	U075	B53	1,200
TXD069452340	Texas Ecologists Inc. Waste Codes: U078,U211	L	35	35	U078	B36	960
NVT330010000	US Ecology Chem Site Inc. Waste Codes: D001,D002,D005, U080,U239,P030,P106,D010,U151, U228,U079,U188,U117,U077,U134	L	35	AG	U079	B88	240

TABLE F-1 (continued)
REQUEST D0906A
DATA SOURCE: TSDR SURVEY CAPACITY DATA SET
WASTE STREAMS WITH SPECIFIED WASTE CODES IN BOOKS J-N
SURFACE DISPOSED CALIFORNIA LIST HOC WASTES
NON-CBI FACILITIES ONLY
ALL VOLUMES ARE IN GALLONS

Facility ID	Facility Name	Book	Question	Key Letter	Waste Code	Waste Desc	1986 Quantity
NYD080336241	Cecos International Waste Codes: U081	L	31	AY	U081	A08	9,701
NYD080336241	Cecos International Waste Codes: U082	L	31	AZ	U082	A08	19
NVT330010000	US Ecology Chem Site Inc. Waste Codes: D001,D002,D006,D010,P030,U211,U057,U239,U188,U002,D007,U127,U185	L	35	AK	U127	B88	480
TXD069452340	Texas Ecologists Inc. Waste Codes: U142	L	31	T	U142	A08	240
NVT330010000	US Ecology Chem Site Inc. Waste Codes: D001,D002,D006,D010,P030,U211,U057,U239,U188,U002,D007,U127,U185	L	35	AK	U185	B88	480
NYD080336241	Cecos International Waste Codes: U225	L	31	BY	U225	A80	12
NVT330010000	US Ecology Chem Site Inc. Waste Codes: D001,D002,U009,U112,U237,P106,U151,U122,U196,U154,U211,U156,U165,U188,U057	L	35	AL	U237	B88	240

TABLE F-2

REQUEST D0906A
DATA SOURCE: TSDR SURVEY CAPACITY DATA SET
WASTE STREAMS WITH SPECIFIED WASTE CODES IN BOOKS J-N
ALL OTHER SURFACE DISPOSED WASTES
NON-CBI FACILITIES ONLY
ALL VOLUMES ARE IN GALLONS

Facility ID	Facility Name	Book	Question	Key Letter	Waste Code	Waste Desc	1986 Quantity
NVT330010000	US Ecology Chem Site Inc. Waste Codes: D001,D002,D005,D007,D009,D010,P106,P030,D008,U151,D004,U204,U134,P098,P087	L	35	AE	P087	B55	960
NVT330010000	US Ecology Chem Site Inc. Waste Codes: D001,U003,U044,U154,U123,D002,P087,P012,U151,U239,U007,P106,P121	L	35	AN	P087	B88	32,160
NVT330010000	US Ecology Chem Site Inc. Waste Codes: D001,D002,D007,D009,D011,U134,P106,D008,P098,P121,D005,D004,P012,P087	L	35	I	P087	B55	960
NVT330010000	US Ecology Chem Site Inc. Waste Codes: D001,D002,U213,U220,U239,U144,U112,U037,U167 U021,U188,U117,U055,U228	L	35	Y	U055	B88	240
OHD087433744	Cecos International Inc. Waste Codes: K022,K083,U012,U055,U188	L	35	CO	U055	B90	8,640
OHD087433744	Cecos International Inc. Waste Codes: K022,K085,U012,U055,U188	L	35	CU	U055	B90	960

TABLE F-2 (continued)
REQUEST D0906A
DATA SOURCE: TSDR SURVEY CAPACITY DATA SET
WASTE STREAMS WITH SPECIFIED WASTE CODES IN BOOKS J-N
ALL OTHER SURFACE DISPOSED WASTES
NON-CBI FACILITIES ONLY
ALL VOLUMES ARE IN GALLONS

Facility ID	Facility Name	Book	Question	Key Letter	Waste Code	Waste Desc	1986 Quantity
OHD087433744	Cecos International Inc. Waste Codes: D001,D014,U240, U093	L	35	BZ	U093	B80	240
NVT330010000	US Ecology Chem Site Inc. Waste Codes: D001,D002,D005, U080,U239,P030,P106,D010,U151, U228,U079,U188,U117,U077,U134	L	35	AG	U117	B88	240
NVT330010000	US Ecology Chem Site Inc. Waste Codes: D001,D002,U213, U220,U239,U144,U112,U037,U167 U021,U188,U117,U055,U228	L	35	Y	U117	B88	240

Table F-3

REQUEST D0912A
DATA SOURCE: TSDR SURVEY CAPACITY DATA SET
WASTE STREAMS WITH SPECIFIED WASTE COES IN BOOK N
CALIFORNIA LIST DEEPWELL WASTES
NON-CBI FACILITIES ONLY
ALL VOLUMES ARE IN GALLONS

Facility ID	Facility Name	Book	Question	Key Letter	Waste Code	1986 Quantity
OKD000402396	Chemical Resources Inc. Waste codes: D001, K086	N	24	D	K086	222,960
TXD027147115	Malone Service Co. Waste Codes: K086	N	20	AD	K086	14,640
TXD078432457	Celanese Chemical Co. Waste Codes: D002,D007,F001,F002,F003,F004,F005,U001,U002,U115,U154,U031,U138,U159,U133,U197,U226	N	24	B	U138	124,000,000
LAD008175390	American Cyanamid Co. Waste Codes: K011,K013,U009,U154,F001,U162,P063,P069,D008 U007,U008,U192	N	24	A	U192	188,727,600
TXD027147115	Malone Service Co. Waste Codes: U226	N	20	AB	U226	480
TXD078432457	Celanese Chemical Co. Waste Codes: D002,D007,F001,F002,F003,F004,F005,U001,U002,U115,U154,U031,U138,U159,U133,U197,U226	N	24	B	U226	124,000,000

Table F-3 (continued)
REQUEST D0912A
DATA SOURCE: TSDR SURVEY CAPACITY DATA SET
WASTE STREAMS WITH SPECIFIED WASTE COES IN BOOK N
CALIFORNIA LIST DEEPWELL WASTES
NON-CBI FACILITIES ONLY
ALL VOLUMES ARE IN GALLONS

Facility ID	Facility Name	Book	Question	Key Letter	Waste Code	1986 Quantity
TXD091270017	Cecos International Inc. Waste Codes: F002;U226	N	24	E	U226	4,080
TXD027147115	Malone Service Co. Waste Codes: U228	N	20	Y	U228	1,200

Table F-4
REQUEST D0912A
DATA SOURCE: TSDR SURVEY CAPACITY DATA SET
WASTE STREAMS WITH SPECIFIED WASTE COES IN BOOK N
ALL OTHER DEEPWELL WASTES
NON-CBI FACILITIES ONLY
ALL VOLUMES ARE IN GALLONS

Facility ID	Facility Name	Book	Question	Key Letter	Waste Code	1986 Quantity
LAD000618256	Cecos International Inc. Waste Codes: F006	N	20	C	F006	62,400
LAD000618256	Cecos International Inc. Waste Codes: F006,U103	N	24	C	F006	3,120
LAD000618256	Cecos International Inc. Waste Codes: D002,F006	N	24	G	F006	1,920
LAD000618256	Cecos International Inc. Waste Codes: K016,K031,F006	N	24	R	F006	339,120
LAD000618256	Cecos International Inc. Waste Codes: F002,F006	N	24	T	F006	1,680
OKD000402396	Chemical Resources Inc. Waste Codes: F006	N	20	B	F006	150,000
OKD000402396	Chemical Resources Inc. Waste Codes: F006,F007,F008	N	24	G	F006	17,040
TXD027147115	Malone Service Co. Waste Codes: F006	N	20	G	F006	12,240
TXD091270017	Cecos International Inc. Waste Codes: F006	N	20	I	F006	3,600

Table F-4 (continued)
REQUEST D0912A
DATA SOURCE: TSDR SURVEY CAPACITY DATA SET
WASTE STREAMS WITH SPECIFIED WASTE COES IN BOOK N
ALL OTHER DEEPWELL WASTES
NON-CBI FACILITIES ONLY
ALL VOLUMES ARE IN GALLONS

Facility ID	Facility Name	Book	Question	Key Letter	Waste Code	1986 Quantity
LAD008213191	Rubicon Inc. Waste Codes: K083,K103,U012, U056,U169	N	24	C	K083	63,120
OHD005108477	Aristech Chemical Co. Waste Codes: K083,U012	N	24	B	K083	5,000,000
LAD008175390	American Cyanamid Co. Waste Codes: K011,K013,U009, U154,F001,U162,P063,P069,D008 U007,U008,U192	N	24	A	P069	188,727,600
LAD008175390	American Cyanamid Co. Waste Codes: K011,K013,U009, U154,F001,U162,P063,P069,D008 U007,U008,U192	N	24	A	U007	188,727,600
LAD008175390	American Cyanamid Co. Waste Codes: K011,K013,U009, U154,F001,U162,P063,P069,D008 U007,U008,U192	N	24	A	U008	188,727,600
OKD000402396	Chemical Resources Inc. Waste Codes: K062,D002,F003, F004,U008,U009	N	24	B	U008	81,120

Table F-4 (continued)
REQUEST D0912A
DATA SOURCE: TSDR SURVEY CAPACITY DATA SET
WASTE STREAMS WITH SPECIFIED WASTE COES IN BOOK N
ALL OTHER DEEPWELL WASTES
NON-CBI FACILITIES ONLY
ALL VOLUMES ARE IN GALLONS

Facility ID	Facility Name	Book	Question	Key Letter	Waste Code	1986 Quantity
LAD008213191	Rubicon Inc. Waste Codes: K083,K103,U012, U056,U169	N	24	C	K083	63,120
OHD005108477	Aristech Chemical Co. Waste Codes: K083,U012	N	24	B	K083	5,000,000
LAD008175390	American Cyanamid Co. Waste Codes: K011,K013,U009, U154,F001,U162,P063,P069,D008 U007,U008,U192	N	24	A	P069	188,727,600
LAD008175390	American Cyanamid Co. Waste Codes: K011,K013,U009, U154,F001,U162,P063,P069,D008 U007,U008,U192	N	24	A	U007	188,727,600
LAD008175390	American Cyanamid Co. Waste Codes: K011,K013,U009, U154,F001,U162,P063,P069,D008 U007,U008,U192	N	24	A	U008	188,727,600
OKD000402396	Chemical Resources Inc. Waste Codes: K062,D002,F003, F004,U008,U009	N	24	B	U008	81,120

Table F-4 (continued)
REQUEST D0912A
DATA SOURCE: TSDR SURVEY CAPACITY DATA SET
WASTE STREAMS WITH SPECIFIED WASTE COES IN BOOK N
ALL OTHER DEEPWELL WASTES
NON-CBI FACILITIES ONLY
ALL VOLUMES ARE IN GALLONS

Facility ID	Facility Name	Book	Question	Key Letter	Waste Code	1986 Quantity
LAD008213191	Rubicon Inc. Waste Codes: K083,K103,U012, U056,U169	N	24	C	U056	63,120
LAD000618256	Cecos International Inc. Waste Codes: F006;U103	N	24	C	U103	3,120
LAD008213191	Rubicon Inc. Waste Codes: D002,D003,U012, U037,U105	N	24	A	U105	1,073,040
LAD008213191	Rubicon Inc. Waste Codes: U012,U105,U106 U169,U221	N	24	E	U105	26,824,080
LAD008213191	Rubicon Inc. Waste Codes: U012,U105,U106 U169,U221	N	24	E	U106	26,824,080
TXD078432457	Celanese Chemical Co. Waste Codes: D002,D007,F001, F002,F003,F004,F005,U001,U002, U115,U154,U031,U138,U159,U133, U197,U226	N	24	B	U133	124,000,000

Table F-4 (continued)
REQUEST D0912A
DATA SOURCE: TSDR SURVEY CAPACITY DATA SET
WASTE STREAMS WITH SPECIFIED WASTE COES IN BOOK N
ALL OTHER DEEPWELL WASTES
NON-CBI FACILITIES ONLY
ALL VOLUMES ARE IN GALLONS

Facility ID	Facility Name	Book	Question	Key Letter	Waste Code	1986 Quantity
KYD003924198	DuPont Waste Codes: D002,F005,F024 F002,F001,U154,U162,U220,U159, U002,U044,U080,U210,U213,F003, U239	N	24	A	U162	55,000,000
LAD008175390	American Cyanamid Co. Waste Codes: K011,K013,U009, U154,F001,U162,P063,P069,D008 U007,U008,U192	N	24	A	U162	188,727,600
TXD027147115	Malone Service Co. Waste Codes: D001,U165	N	24	AA	U165	240
TXD027147115	Malone Service Co. Waste Codes: D001,U031,U165, U159	N	24	R	U165	1,680
LAD008213191	Rubicon Inc. Waste Codes: K083,K103,U012, U056,U169	N	24	C	U169	63,120
LAD008213191	Rubicon Inc. Waste Codes: U012,U105,U106, U169,U221	N	24	E	U169	26,824,080

Table F-4 (continued)
REQUEST D0912A
DATA SOURCE: TSDR SURVEY CAPACITY DATA SET
WASTE STREAMS WITH SPECIFIED WASTE COES IN BOOK N
ALL OTHER DEEPWELL WASTES
NON-CBI FACILITIES ONLY
ALL VOLUMES ARE IN GALLONS

Facility ID	Facility Name	Book	Question	Key Letter	Waste Code	1986 Quantity
TXD078432457	Celanese Chemical Co. Waste Codes: D002,D007,F001, F002,F003,F004,F005,U001,U002, U115,U154,U031,U138,U159,U133, U197,U226	N	24	B	U197	124,000,000
KYD003924198	DuPont Waste Codes: D002,F005,F024 F002,F001,U154,U162,U220,U159, U002,U044,U080,U210,U213,F003, U239	N	24	A	U213	55,000,000

F.2 Documentation On the Use of Volumes From Previous Capacity Analysis

This section lists those waste codes and associated volumes that were obtained from the background documents from previous capacity analyses. These volumes were reevaluated for the Third Third final rule because of BDAT revisions or additions from the background documents from the previous capacity analysis.

Waste Code	Total Quantity	Quantity Requiring Treatment Capacity
F024	81,025[a]	8,785
K069 (calcium sulfate)	41[b]	41
K083	75,732[c]	15,146

In the Second Third rule, 8,062 gallons/year of F024 waste was assigned to stabilization of incinerator ash and 723 gallons/year was assigned to stabilization of scrubber water treatment sludge, both after incineration of wastewaters and nonwastewaters. EPA is promulgating BDAT standards for new nonwastewaters metal constituents based on stabilization. Therefore, the volumes of F024 waste have been 'worst cased' and re-assigned to stabilization in the Third Third capacity analysis despite prior inclusion in the baseline study.

In the First Third rule, the 'no land disposal' restriction was promulgated for K083 nonwastewaters based on the performance of incineration. EPA is revoking this restriction and promulgating concentration restrictions based on incineration for organics and stabilization for inorganics. Based on the 75,732 gallons/year assigned to combustion in the First Third rule, 15,146 gallons/year is being assigned to stabilization in the Third Third rule.

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[a] Source: Background Document for Second Third Wastes to Support 40 CFR Part 268 Land Disposal Restrictions, Final Rule, Volume I, June 1989, p. 2-93.

[b] Source: Single generator of waste that responded to Waste Treatment Branch.

[c] Background Document for First Third Wastes to Support 40 CFR Part 268 Land Disposal Restrictions, Final Rule, August 1988, p. 2-77.

For K069 non-calcium sulfate nonwastewaters, EPA is promulgating recycling as a method in place of the 'no land disposal based on recycling' restrictions promulgated in the First Third rule. For calcium sulfate nonwastewaters, EPA is promulgating stabilization as a BDAT. Through comments, EPA has identitfied a single generator of this waste. Therefore, the volume generated by this one generator has been added to the capacity data set and assigned to stabilization.

Appendix G

Documentation for California List HOCs

The California list final rule for Halogenated Organic Compounds (HOCs) was not waste code specific, but instead regulated all hazardous wastes containing HOCs above a specified concentration. Consequently, the Agency's capacity analysis for HOCs included some Third Third wastes. Today's rule is waste code specific; therefore, some overlap exists between the California list final rule and the Third Third final rule. In addition, some of the technologies to which Third Third wastes were assigned for the California list final rule may no longer be appropriate as a result of today's rule.

The Agency has therefore decided to reanalyze all California list HOC wastes subject to today's rule and has included these wastes in the estimates of required capacity as a result of the Third Third final rule. The following tables present these wastes, their TRD groups, and volumes requiring alternative treatment capacity; Table I-1 listing the surface disposed wastes, Table I-2 listing the deepwell injected wastes. In order to avoid double counting these wastes, the Agency has subtracted their volumes from required capacity estimates for the California list final rule, and has rendered the capacity to which these wastes were assigned under the California list final rule as available for the Third Third final rule.

TABLE G-1
REQUEST C0367G01
DATA SOURCE: TSDR SURVEY

WASTE VOLUMES (GALS) BY WASTE CODE, WASTE DESCRIPTION, AND TRD GROUP
SURFACE DISPOSED CALIFORNIA LIST HOC'S
SINGLE WASTE CODES ONLY BY WASTE CODE

Waste Code	Waste Desc	No TRD 1986 Vol	With TRD 1986 Vol	With TRD 1988 Vol	1988 Volume w/o Reason	TRD Group	ATR Code	Volume Assigned
D012	B02	0	144,000	144,000	144,000	2	1	144,000
							2	0
D012	B44	500,000	0	0	0			0
D012	B64	0	16,800	16,800	16,800	2	1	0
							2	0
D012	B80	0	288,000	288,000	288,000	2	1	0
							2	0
D013	B02	960	0	0	0			0
D013	B02	0	720,000	720,000	720,000	2	1	720,000
							2	0
D013	B44	500,000	0	0	0			0
D013	B70	480	0	0	0			0
D013	B80	0	291,120	291,120	291,120	2	1	0
							2	0
D014	B02	0	864,000	864,000	864,000	2	1	864,000
							2	0

REQUEST C0367G01
DATA SOURCE: TSDR SURVEY

WASTE VOLUMES (GALS) BY WASTE CODE, WASTE DESCRIPTION, AND TRD GROUP
SURFACE DISPOSED CALIFORNIA LIST HOC'S
SINGLE WASTE CODES ONLY BY WASTE CODE

Waste Code	Waste Desc	No TRD 1986 Vol	With TRD		1988 Volume w/o Reason	TRD Group	ATR Code	Volume Assigned
			1986 Vol	1988 Vol				
D014	B80	0	240	240	240	2	1 2	0 0
D015	B	7,968	0	0	0			0
D015	B02	0	720,000	720,000	720,000	2	1 2	720,000 0
D015	B56	0	720	720	720	1	1	0
D016	B02	0	720,000	720,000	720,000	2	1 2	720,000 0
D016	B64	0	11,520	11,520	11,520	2	1 2	0 0
D016	B70	0	240	240	240	1	1	0
D016	B80	0	187,680	187,680	187,680	2	1 2	0 0
D016	B86	0	240	240	240	1	1	0
D016	B90	0	240	240	240	1	1	0
K085	A07	0	98,640	98,640	98,640	39	1A 2A	0

REQUEST C0367G01
DATA SOURCE: TSDR SURVEY

WASTE VOLUMES (GALS) BY WASTE CODE, WASTE DESCRIPTION, AND TRD GROUP
SURFACE DISPOSED CALIFORNIA LIST HOC'S-
SINGLE WASTE CODES ONLY BY WASTE CODE

Waste Code	Waste Desc	No TRD 1986 Vol	With TRD 1986 Vol	With TRD 1988 Vol	1988 Volume w/o Reason	TRD Group	ATR Code	Volume Assigned
K105	A	0	0	0	0			0
K105	A05	0	4,560	4,560	4,560	21	23	0
							5	0
							21	0
							22	0
							8	0
P024	A01	0	480	480	480	3	1B	0
							2B	0
P024	A08	0	2,880	2,880	2,880	2	1	0
							2	0
P024	A08	0	240	240	240	2	1	0
							2	0
P028	A08	0	720	720	720	2	1	0
P037	A08	0	240	240	240	1	1	0
P123	A08	0	1,200	1,200	1,200	39	1A	0
							2A	
U006	A01	0	1,920	1,920	1,920	3	1B	1,920
							2B	0
U006	A05	1	0	0	0			0

REQUEST C0367G01
DATA SOURCE: TSDR SURVEY

WASTE VOLUMES (GALS) BY WASTE CODE, WASTE DESCRIPTION, AND TRD GROUP
SURFACE DISPOSED CALIFORNIA LIST HOC'S
SINGLE WASTE CODES ONLY BY WASTE CODE

Waste Code	Waste Desc	No TRD 1986 Vol	With TRD 1986 Vol	With TRD 1988 Vol	1988 Volume w/o Reason	TRD Group	ATR Code	Volume Assigned
U030	A11	0	240	240	240	2	1 2	0 0
U036	A08	0	4,080	4,080	4,080	2	1 2	0
U036	A11	0	960	960	960	2	1 2	0
U044	A05	13	0	0	0			0
U044	A08	0	4,320	4,320	4,320	3	1B 2B	0
U044	A08	0	240	240	240	3	1B 2B	240 0
U061	A08	0	3,600	3,600	3,600	2	1 2	0 0
U061	A08	0	480	480	480	2	1 2	0 0
U072	A08	0	218,160	218,160	218,160	2	1 2	0 0

REQUEST C0367G01
DATA SOURCE: TSDR SURVEY

WASTE VOLUMES (GALS) BY WASTE CODE, WASTE DESCRIPTION, AND TRD GROUP
SURFACE DISPOSED CALIFORNIA LIST HOC'S
SINGLE WASTE CODES ONLY BY WASTE CODE

Waste Code	Waste Desc	No TRD 1986 Vol	With TRD 1986 Vol	With TRD 1988 Vol	1988 Volume w/o Reason	TRD Group	ATR Code	Volume Assigned
U072	AEB	0	240	240	240	2	1 2	0 0
U073	A08	0	240	240	240	3	1B 2B	0 0
U076	A08	0	8,880	8,880	8,880	2	1 2	0 0
U080	A	1,440	0	0	0			0
U080	A05	23	0	0	0			0
U080	A08	0	960	960	960	3	1B 2B	0 0
U129	A08	0	480	480	480	2	1	0
U131	A13	0	144,000	144,000	144,000	2	1 2	0
U138	A05	10	0	0	0			0
U142	A08	0	240	240	240	2	1 2	0 0
U156	A11	0	1,440	1,440	1,440	2	1 2	0 0
U158	A	2,400	0	0	0			0

REQUEST C0367G01
DATA SOURCE: TSDR SURVEY

WASTE VOLUMES (GALS) BY WASTE CODE, WASTE DESCRIPTION, AND TRD GROUP
SURFACE DISPOSED CALIFORNIA LIST HOC'S
SINGLE WASTE CODES ONLY BY WASTE CODE

Waste Code	Waste Desc	No TRD 1986 Vol	With TRD 1986 Vol	With TRD 1988 Vol	1988 Volume w/o Reason	TRD Group	ATR Code	Volume Assigned
U158	A13	0	3,840	3,840	3,840	2	1 2	0 0
U209	A08	0	6,240	6,240	6,240	3	1B 2B	6,240 0
U210	A05	0	1,700	1,700	1,700	40	5 21 22 24 6	0 0 0 0 0
U210	A08	0	720	720	720	2	1 2	0 0
U210	A08	0	6,480	6,480	6,480	2	1 2	6,480 0
U211	A05	11	0	0	0			0
U211	A08	0	240	240	240	2	1 2	0
U226	A05	1	0	0	0			0
U226	A08	0	6,240	6,240	6,240	3	1B 2B	720 0
U226	A13	0	240	240	240	2	1 2	0 0

REQUEST C0367G01
DATA SOURCE: TSDR SURVEY

WASTE VOLUMES (GALS) BY WASTE CODE, WASTE DESCRIPTION, AND TRD GROUP
SURFACE DISPOSED CALIFORNIA LIST HOC'S
SINGLE WASTE CODES ONLY BY WASTE CODE

Waste Code	Waste Desc	No TRD 1986 Vol	With TRD 1986 Vol	With TRD 1988 Vol	1988 Volume w/o Reason	TRD Group	ATR Code	Volume Assigned
U227	A08	0	3,600	3,600	3,600	3	1B	0
							2B	0
U228	A13	0	480	480	480	2	1	0
							2	0
U240	A08	0	20,400	20,400	20,400	2	1	0
							2	0
U240	AEF	0	720	720	720	2	1	0
							2	0
D012	B80	0	146,400	146,400	146,400	1	1	0
							2	0
D013	B80	0	146,400	146,400	146,400	1	1	0
							2	0
D014	B	0	1,920,000	1,920,000	1,920,000	75	48	0
							59	0
D014	B80	0	480	480	480	2	1	0
							2	0
D014	B90	0	0	0	0	2	1	0
							2	0
D014	B80	0	0	0	0	2	1	0
							2	0

REQUEST C0367G01
DATA SOURCE: TSDR SURVEY

WASTE VOLUMES (GALS) BY WASTE CODE, WASTE DESCRIPTION, AND TRD GROUP
SURFACE DISPOSED CALIFORNIA LIST HOC'S
SINGLE WASTE CODES ONLY BY WASTE CODE

Waste Code	Waste Desc	No TRD 1986 Vol	With TRD 1986 Vol	With TRD 1988 Vol	1988 Volume w/o Reason	TRD Group	ATR Code	Volume Assigned
D015	B	2,256	0	0	0			0
D016	B64	1,168,800	0	0	0			0
K017	B82	0	5,760	5,760	5,760	2	1	0
							2	0
K017	B82	0	62,640	62,640	62,640	65	41	0
							7	0
K116	B64	93,578,880	0	0	0			0
P004	B89	0	336	336	336	2	1	0
							2	0
P037	B89	0	336	336	336	2	1	0
P123	B81	0	480	480	480		2	0
						2	1	0
							2	0
U036	B80	0	0	0	0	2	1	0
							2	0
U036	B89	0	336	336	336	2	1	0
							2	0
U071	B89	0	480	480	480	2	1	0
							2	0
U072	B89	0	480	480	480	2	1	0
							2	0

REQUEST C0367G01
DATA SOURCE: TSDR SURVEY

WASTE VOLUMES (GALS) BY WASTE CODE, WASTE DESCRIPTION, AND TRD GROUP
SURFACE DISPOSED CALIFORNIA LIST HOC'S
SINGLE WASTE CODES ONLY BY WASTE CODE

Waste Code	Waste Desc	No TRD 1986 Vol	With TRD		1988 Volume w/o Reason	TRD Group	ATR Code	Volume Assigned
			1986 Vol	1988 Vol				
U080	B36	0	136,956	136,956	136,956	1	1	0
U240	B	0	0	0	0	1	1	0
U240	B80	0	240	240	240	2	1	0
							2	0
U037	B64	1,073,040	0	0	0			0
U037	B89	0	3,180	3,180	3,180	2	1	0
							2	0
U044	B89	0	288	288	288	2	1	0
							2	0
U071	B89	0	320	320	320	2	1	0
							2	0
U072	B89	0	320	320	320	2	1	0
							2	0
U077	B08	52,895,520	0	0	0			0
U080	B	1,200	0	0	0			0
U080	B02	0	2,654,520	2,654,520	2,654,520	5	5	0
							21	0
							22	0
U080	B89	0	3,468	3,468	3,468	2	1	0
							2	0

REQUEST C0367G01
DATA SOURCE: TSDR SURVEY

WASTE VOLUMES (GALS) BY WASTE CODE, WASTE DESCRIPTION, AND TRD GROUP
SURFACE DISPOSED CALIFORNIA LIST HOC'S-
SINGLE WASTE CODES ONLY BY WASTE CODE

Waste Code	Waste Desc	No TRD 1986 Vol	With TRD 1986 Vol	With TRD 1988 Vol	1988 Volume w/o Reason	TRD Group	ATR Code	Volume Assigned
U121	B02	2,017,560	0	0	0			0
U129	B89	0	336	336	336	2	1 2	0 0
U158	B42	0	246,240	246,240	246,240	20	7	0
U192	B81	0	1,440	1,440	1,440	2	1 2	0 0
U208	B89	0	48	48	48	2	1 2	0 0
U209	B89	0	4,800	4,800	4,800	2	1 2	0 0
U210	B89	0	3,180	3,180	2	1 2	0 0	
U211	B89	0	608	608	608	2	1 2	0 0
U226	B02	2,017,560	0	0	0			0
U226	B89	0	48	48	48	2	1 2	0 0
U226	B90	0	9,120	9,120	9,120	2	1 2	0 0

REQUEST C0367G01
DATA SOURCE: TSDR SURVEY

WASTE VOLUMES (GALS) BY WASTE CODE, WASTE DESCRIPTION, AND TRD GROUP
SURFACE DISPOSED CALIFORNIA LIST HOC'S-
SINGLE WASTE CODES ONLY BY WASTE CODE

Waste Code	Waste Desc	No TRD 1986 Vol	With TRD 1986 Vol	With TRD 1988 Vol	1988 Volume w/o Reason	TRD Group	ATR Code	Volume Assigned
U227	B02	0	2,654,520	2,654,520	2,654,520	5	5	0
							21	0
							22	0
U228	B89	0	3,180	3,180	3,180	2	1	0
							2	0
U240	B81	0	1,440	1,440	1,440	2	1	0
							2	0
U247	B89	0	336	336	336	2	1	0
							2	0

TABLE G-2

REQUEST C0367G01
DATA SOURCE: TSDR SURVEY

WASTE VOLUMES (GALS) BY WASTE CODE, WASTE DESCRIPTION, AND TRD GROUP
CALIFORNIA LIST HOC'S
SINGLE WASTE CODES ONLY BY WASTE CODE
UNDERGROUND INJECTION WELL ONLY

Waste Code	Waste Desc	No TRD 1986 Vol	With TRD 1986 Vol	With TRD 1988 Vol	1988 Volume w/o Reason	TRD Group	ATR Code	Volume Assigned
D014	B01	0	56,880	56,880	56,880	19	5	0
							21	0
							22	0
							3	0
							4	0
K033	A07	0	4,237,680	4,237,680	4,237,680	40	5	0
							21	0
							22	0
							24	0
							6	0
K097	A07	0	21,120	21,120	21,120	40	5	0
							21	0
							22	0
							24	0
							6	0
P058	A05	0	12,720	12,720	12,720	35	38	12,720
U044	A13	0	12,000	12,000	12,000	3	1B	0
							2B	0
U074	A13	0	50,400	50,400	50,400	3	1B	0
							2B	0
U077	A05	0	9,594,480	9,594,480	9,594,480	40	5	0
							21	0
							22	0
							24	0
							6	0

TABLE G-2
REQUEST C0367G01
DATA SOURCE: TSDR SURVEY

WASTE VOLUMES (GALS) BY WASTE CODE, WASTE DESCRIPTION, AND TRD GROUP
CALIFORNIA LIST HOC'S
SINGLE WASTE CODES ONLY BY WASTE CODE
UNDERGROUND INJECTION WELL ONLY

Waste Code	Waste Desc	No TRD 1986 Vol	With TRD		1988 Volume w/o Reason	TRD Group	ATR Code	Volume Assigned
			1986 Vol	1988 Vol				
U080	A08	0	3,360	3,360	3,360	3	1B	0
							2B	0
U185	A05	0	1,000,000	1,000,000	1,000,000	21	23	0
							5	0
							21	0
							22	0
							3	0
U210	A05	0	1,000,000	1,000,000	1,000,000	40	5	0
							21	0
							22	0
							24	0
							6	0
U211	A05	0	11,520	11,520	11,520	40	5	0
							21	0
							22	0
							24	0
							6	0

TABLE G-2
REQUEST C0367G01
DATA SOURCE: TSDR SURVEY

WASTE VOLUMES (GALS) BY WASTE CODE, WASTE DESCRIPTION, AND TRD GROUP
CALIFORNIA LIST HOC'S
SINGLE WASTE CODES ONLY BY WASTE CODE
UNDERGROUND INJECTION WELL ONLY

Waste Code	Waste Desc	No TRD 1986 Vol	With TRD		1988 Volume w/o Reason	TRD Group	ATR Code	Volume Assigned
			1986 Vol	1988 Vol				
D012	B70	0	2,333,333	2,333,333	2,333,333	83	61	0
D013	B70	0	2,333,333	2,333,333	2,333,333	83	61	0
D014	B70	0	2,333,333	2,333,333	2,333,333	83	61	0
D015	B70	0	2,333,333	2,333,333	2,333,333	83	61	0
D016	B70	0	2,333,333	2,333,333	2,333,333	83	61	0
D017	B70	0	2,333,333	2,333,333	2,333,333	83	61	0
K017	B01	0	88,080,000	88,080,000	88,080,000	46	5	0
							6	0
							21	0
							22	0
K032	B07	0	22	22	22	10	12	0
							13	0
							49	0
K033	B07	0	22	22	22	10	12	0
							13	0
							49	0
K097	B07	0	22	22	22	10	12	0
							13	0
							49	0

TABLE G-2
REQUEST C0367G01
DATA SOURCE: TSDR SURVEY

WASTE VOLUMES (GALS) BY WASTE CODE, WASTE DESCRIPTION, AND TRD GROUP
CALIFORNIA LIST HOC'S
SINGLE WASTE CODES ONLY BY WASTE CODE
UNDERGROUND INJECTION WELL ONLY

Waste Code	Waste Desc	No TRD 1986 Vol	With TRD 1986 Vol	With TRD 1988 Vol	1988 Volume w/o Reason	TRD Group	ATR Code	Volume Assigned
P050	B14	0	227,520	227,520	227,520	5	5	0
							21	0
							22	0
P051	B14	0	46,080	46,080	46,080	5	5	0
							21	0
							22	0
P059	B14	0	227,520	227,520	227,520	5	5	0
							21	0
							22	0
U034	B02	0	17,600	17,600	17,600	40	5	0
							21	0
							22	0
							24	0
							6	0
U037	B01	0	66,240	66,240	66,240	40	5	0
							21	0
							22	0
							24	0
							6	0
U037	B64	0	1,073,040	1,073,040	1,073,040	36	1B	0
							2B	1,073,040
							5	0
							21	0
							22	0

TABLE G-2
REQUEST C0367G01
DATA SOURCE: TSDR SURVEY

WASTE VOLUMES (GALS) BY WASTE CODE, WASTE DESCRIPTION, AND TRD GROUP
CALIFORNIA LIST HOC'S
SINGLE WASTE CODES ONLY BY WASTE CODE
UNDERGROUND INJECTION WELL ONLY

Waste Code	Waste Desc	No TRD 1986 Vol	With TRD 1986 Vol	With TRD 1988 Vol	1988 Volume w/o Reason	TRD Group	ATR Code	Volume Assigned
U041	B01	0	30,178,560	30,178,560	30,178,560	40	5	0
							21	0
							22	0
							24	0
							6	0
U044	B02	0	17,600	17,600	17,600	40	5	0
							21	0
							22	0
							24	0
							6	0
U045	B02	0	17,600	17,600	17,600	40	5	0
							21	0
							22	0
							24	0
							6	0
U077	B01	0	30,178,560	30,178,560	30,178,560	40	5	0
							21	0
							22	0
							24	0
							6	0
U080	B02	2,654,520	2,654,520	2,654,520	2,654,520			0
U083	B01	0	30,178,560	30,178,560	30,178,560	40	5	0
							21	0
							22	0
							24	0
							6	0

TABLE G-2
REQUEST C0367G01
DATA SOURCE: TSDR SURVEY

WASTE VOLUMES (GALS) BY WASTE CODE, WASTE DESCRIPTION, AND TRD GROUP
CALIFORNIA LIST HOC'S
SINGLE WASTE CODES ONLY BY WASTE CODE
UNDERGROUND INJECTION WELL ONLY

Waste Code	Waste Desc	No TRD 1986 Vol	With TRD 1986 Vol	With TRD 1988 Vol	1988 Volume w/o Reason	TRD Group	ATR Code	Volume Assigned
U084	B01	0	30,178,560	30,178,560	30,178,560	40	5	0
							21	0
							22	0
							24	0
							6	0
U227	B02	2,654,520	2,654,520	2,654,520	2,654,520			0

APPENDIX H

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APPENDIX I

MEMORANDUM ON AVAILABILITY OF SURVEYS

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

OFFICE OF
SOLID WASTE AND EMERGENCY RESPONSE

MEMORANDUM

DATE: May 8, 1990

SUBJECT: The National Survey of Hazardous Waste Treatment, Storage, Disposal, and Recycling Facilities and National Survey of Hazardous Waste Generators

FROM: Jo-Ann Bassi
Land Disposal Branch

TO: Docket

The National Survey of Hazardous Waste Treatment, Storage, Disposal, and Recycling Facilities was conducted during 1987-1989. The Survey included about 2,500 hazardous waste facilities, i.e., facilities with RCRA permits or RCRA interim status. However, for the capacity analysis for land disposal restrictions, those facilities with land disposal (i.e., waste piles, surface impoundments, landfills, land treatment, deep wells), or with commercial processes were considered. These facilities were designated as priority facilities and the survey responses provide the basis for the capacity analysis for the land disposal restrictions rules (including the analysis of land disposal volumes requiring alternative treatment/recycling capacity, and analysis of available commercial capacity). All surveys were first screened to be classified as priority or non-priority. For the priority facilities, EPA conducted a comprehensive technical review of survey responses and a facility capacity analysis, and also developed a capacity data base. This data base was then used for the national capacity analysis for the land disposal restrictions.

Given the large amount of materials, the actual TSDR Survey booklets, all data provided in response to the Survey, all data provided in follow-up for additional information (especially on planned changes), and technical evaluation documentation are located at EPA's contractor and will be available to the public upon request to the Docket.

The National Survey of Hazardous Waste Generators was conducted during 1987-1989. The survey included over 10,000 facilities throughout the United States. However, only a subset of facilities was available to support the Third Third final rule. Printouts containing the data used by EPA are included in a report entitled "Analysis of Generator Survey Data for the Third Third Wastes Final Rule," which is included in the Docket for this final rule. Given the large amount of materials, the actual Generator Survey booklets and technical evaluation documentation that were used for the Third Third rule are located at EPA's contractor, and will be available to the public per requests to the Docket.